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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 888.] SATURDAY, JULY 2, 1887. [PRICE FOURPENCE.

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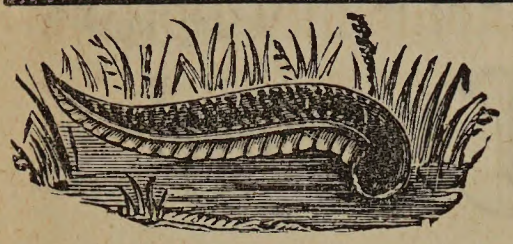

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Ditto, in boxes to sell at ... ... „	0	2	0
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500 sheets in a packet... ... ... per doz.	0	4	0
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A remedy for neuralgic pains. Not liable for stamp duty, being a pure drug.			
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One dozen in a counter box.			
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Penny size ... ... per gross	0	9	0
Sixpenny size ... ... per doz.	0	4	0
1 dozen mounted on an attractive show card. (4 leaves in a packet.)			
NURSERY APRONS (Full size)—			
Black Alpaca ... ... per doz.	0	18	0
Check ... ... „	1	4	0
Super quality ... ... „	1	10	0
NURSERY LAMPS—			
The "A.B.C." The cheapest article ever introduced. Burns kerosene oil ... per doz.	1	2	0
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SOAP—			
Transparent, in ½-lb. and 1-lb. bars ... per cwt.	2	16	0
Ditto, in tablets, 2, 3, 4, 6 to the lb., „	2	18	0
Toilet, in ½-lb. and 1-lb. bars ... „	2	16	0
Ditto, in tablets, 2, 3, 4, 6 to the lb., „	2	18	0
Oval Transparent tablet (wrapped) ...per gross	1	4	0

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The
Pharmaceutical Journal
AND
Transactions.

VOL. XVIII.—JULY 2, 1887.

THE CHEMISTRY OF "CACUR."

BY G. ARMSTRONG ATKINSON, M.B.,

Assistant to the Professor of Materia Medica, University of Edinburgh.

(From the Pharmacological Laboratory of the University.)

In the *Edinburgh Medical Journal* for July, 1886, I published a note on the action of cacur, cacuo or small bitter apple, cacur being the Kaffir name for the fruit of the *Cucumis Myriocarpus* (Cucurbitaceæ). In this paper it was shown that the fruit in small doses is purgative, in larger emetic, and if sufficient of the drug be retained after vomiting has occurred purgation also ensues. The action is somewhat like that of colocynth as far as its purgative qualities go, but it differs in that it more readily induces vomiting. The supply of the drug at the time these experiments were carried out was too small to permit of any chemical examination. Through the kindness of Mr. J. A. B. Bayley, a further supply of the fruit was forwarded me some months ago, and as from experiments with other parts of the plant I had satisfied myself that the fruit alone was active, it only was examined in detail. The fruit is a pepo, the pepoes are caducous, subglobose, and vary in size from small to very large gooseberries, which they resemble in form. When unripe they are green, when mature yellow, and are beset somewhat sparingly with short soft prickles. The South African natives use them principally as an emetic, generally in their green or yellowish-green state. The fruit does not spontaneously expel its contents. Each pepo weighs from 50 to 100, or even 130 grains, the average weight being from 70 to 80 grains. The placentæ are parietal, and bear numerous ovoid, flattened, exalbuminous, almost white seeds, the testæ of which have a faint bitterness, apparently absorbed from the surrounding pulp. The seeds constitute about 14 or 15 per cent. by weight of the fresh fruit. The pulp is very watery and has a faint cucumber-like odour, and a very bitter taste. The rind is soft and thin, and can only be peeled off with considerable difficulty; its inner layers have the same odour and bitter taste which characterize the pulp. The pulp and rind when dried lose weight very markedly; 1000 grains of rind and pulp from which the seeds had been removed when dried so as to be powdered weighed only 53 grains. In drying it is necessary to use a low heat or the active principle will be decomposed. The usual purgative dose employed is one pepo, which when dried and the seeds removed would weigh about 3 or 4 grains; two pepoes are employed when emesis is desired. In either case the Kaffirs heat the fruit before using it, probably to render the pulp more watery, as they squirt the contents of the pepoes into their mouths and swallow the expelled material. A considerable quantity of colloid material is in the pulp, and doubtless assists the action of the drug by retarding absorption of the active principle, for this when isolated, as described below, acted less constantly than the fresh pulp. No tannic acid is found in the fruit, but a considerable quantity of chlorophyll is present. The active principle, as mentioned above, is injured by a high temperature, as by that of boiling water; this, together with the fact that few reagents precipitate it, render its isolation somewhat difficult by any of the ordinary processes, which were all tried with varying and inconstant results. The method which gave a satisfactory yield, quantitatively and qualitatively, was very simple. The seeds were removed from the pepoes, which were cut up as finely as possible and then dried at a low temperature in an air-bath. The product was powdered and exhausted with rectified spirit. The spirituous solution was evaporated almost to dryness, as small an amount of heat as possible being employed, and the residue dissolved in a little water to which freshly precipitated oxide of lead was added to decolorize the solution. This required about twenty-four hours with frequent agitation. The mixture was then filtered, and the almost colourless filtrate exhausted with ether without further evaporation. The ether extracted the active principle, and when decanted was quite colourless, but possessed a very bitter taste. After slow evaporation of the ether a very pale yellow body was left, which became resinoid in appearance and brittle, being easily reduced to a pale yellow powder, intensely bitter, and producing the pharmacological actions of the fruit, but not, as previously stated, being so constant in action. The yield was very small; it was quite amorphous, no method of treatment yielding any trace of crystallization. The body so extracted dissolves readily in water; it is soluble in alcohol of all strengths, but less readily in very strong than in weaker alcohol. In ether it dissolves, but not very readily, although sufficiently to allow extraction by its means. In chloroform it is only slightly soluble, and less so in petroleum spirit. When heated on the platinum foil it burns readily with little charring, and leaves no residue. Strong sulphuric acid dissolves it with the production of a brownish-red colour, and Fröhde's reagent produces the same colour reaction. Nitric, hydrochloric and acetic acids give no distinct colour reactions. The watery solution is neutral to litmus paper. Tannic acid

produces a bulky yellow precipitate soluble in excess of the reagent. Phosphomolybdic acid, solution of iodine in iodide of potassium, platinic chloride, iodide of bismuth and potassium, iodide of potassium and mercury, picric acid, acetate and basic acetate of lead, ferric chloride, nitrate of silver and mercuric chloride are without visible effect. Solutions of alkalies turned the practically colourless watery solution yellow, and the bitterness entirely disappears; if digested some time with dilute acids a similar coloration and loss of bitterness occurs, and a similar result is obtained on merely boiling for some little time. In all cases a yellowish flocculent precipitate separates out which is tasteless, and apparently without action. The watery solution reduces Fehling's solution, but does not ferment with yeast, nor does any of the solutions which result from treatment of the watery solution with an alkali, with an acid, or with heat alone. No other active body was detected in the fruit. The active substance is thus seen to be apparently a neutral principle, which is not a glucoside, and in accordance with the usual nomenclature might be termed "myriocarpin."

BANQUET TO PROFESSOR TYNDALL.

On Wednesday evening a banquet was held in Willis's Rooms, the object of which was to present to Professor Tyndall, on the occasion of his retirement from the Chair of Natural Philosophy in the Royal Institution, a formal recognition of the services rendered by him to the cause of scientific progress. The chair was taken by Professor Stokes, President of the Royal Society, who was supported by a very numerous and influential company. The toast of the evening was proposed by the Chairman and responded to as follows :—

Professor Stokes said: I now come to the toast of the evening, "The Health of Dr. Tyndall," and may he long enjoy the leisure which he has so well earned. A social gathering like the present is not an occasion on which it is desirable to enter into detail as to the scientific labours of a man, however eminent. Yet the circumstances of the present meeting seem to demand that I should say a few words on some of Dr. Tyndall's researches. Some of his earliest scientific work related to diamagnetism and magneto-crystallic action, and in part of this he was associated with the well-known German physicist, Knoblauch. But I cannot dwell on these now. And I will even dismiss with this brief mention his researches on the properties of ice, and his application of them to the theory of glaciers, and the observations which he made in common with his friend and colleague, Professor Huxley, whose necessary absence from among us to-night we so much regret. If I be not trespassing too much on the patience of those who listen to me, I would wish to say a little more on that elaborate series of researches, forming no less than six separate papers in the "Philosophical Transactions," in which Dr. Tyndall investigated the relation of simple and compound gases and of vapours to radiant heat, especially radiant heat from sources at a moderate temperature. According to his researches, while the main constituents of the earth's atmosphere, nitrogen and oxygen, are practically diathermenous, at least, with regard to radiations which can traverse rock salt, as we know that by far the greater part of those that we have to deal with can, such is far from being the case with other gases equally transparent with regard to light. Dr. Tyndall found that as a rule the more complex the composition of a gas the greater is its defect of diathermancy. To confine ourselves to the two gases which occur in the atmosphere mixed with its main constituents—I allude, of course, to carbonic acid and to water in the gaseous state of vapour—he found that both, especially the latter, which likewise is present in by far the larger quantity, are very distinctly defective in diathermancy, and he concluded that the main part of the absorption of solar heat in passing through the atmosphere—absorption as distinguished from scattering—is due to the watery vapour which it contains. From this result he drew important inferences as to atmospheric temperature and climatological conditions. Dr. Tyndall's researches on the relation of gases to radiant heat came naturally before me during my long tenure of office in one of the laboratories of the Royal Society; and, for my own part, I may say that it seemed to me all along that the results were established on so firm a basis, and the conclusions regarding the invisible radiations were so perfectly analogous to what we knew to be true regarding the visible ones, where the investigation is comparatively easy, that the work bore on it the stamp of truth. The conclusions were not, however, accepted without opposition. In the late Professor Magnus Dr. Tyndall met a foeman worthy of his steel; a foeman, however, only in the sense of an intellectual athlete; for socially I doubt not they were sworn friends, and their friendship was even cemented by the fact that they were both alike seeking after truth in a similar subject. But truth only gains by opposition; its defenders are led to engage in fresh researches which end in strengthening its foundations. I think that the validity of Dr. Tyndall's results is now generally admitted. If some hesitation is still felt it arises mainly, I think, from misconception; from imagining that assertions which were meant to apply only to heat-rays of such refrangibilities as to be absorbed by water were meant to be affirmed of the invisible radiations generally which lie beyond the extreme red. The time reminds me that I must only very briefly refer to another investigation in which Dr. Tyndall has more recently been engaged, and of which the interest is biological, while the means of investigation are physical. I allude, of course, to the question of abiogenesis. Here, again, Dr. Tyndall was working on contested ground, and the objections of opponents stimulated him to fresh inquiries, which resulted in the continual strengthening of his negative conclusions. In the course of his work he was led, for instance, to the discovery of the great difference which exists between the germs of microscopic creatures and the creatures themselves, in relation to their power of resisting the destructive influence of a high temperature. This discovery not only detected a source of error in some experiments which had seemed to favour the hypothesis of abiogenesis, but threw important light on the conditions which must be fulfilled in order to secure complete sterility. But original research is not the only way in which a man can advance the cause of science. All important though it is, it nevertheless often happens that an original investigation is too abstruse to be followed by more than a few experts; nor is it by any means necessarily the case that an eminent investigator is equally successful in expounding to others, especially to a mixed audience, the results at which he himself or other investigators may have arrived. The general diffusion of science depends largely on the clearness with which its leading principles and results are expounded, whether by lectures or by treatises, in which, while they are scientifically sound, popularity of style and general readableness are not sacrificed to the dry exactness of scientific detail. Most of us have had opportunities, whether at the Royal Institution, with which the name of Tyndall has so long been connected, or elsewhere, of being impressed with the singularly

lucid style and graphic expression with which he expounded to his audience the salient points of the scientific subject which he brought before them. Nor was it only in clearness of verbal exposition that he excelled; the manipulative skill with which his original investigations were carried on served him in good stead in his more popular expositions; and by the aid of that "domestic sun," which even the murky atmosphere of a London winter could not obscure, he was enabled in very many cases to exhibit to the audience the actual results of experiments which had first been carried out in the quiet of the laboratory. Nor is it our own countrymen alone who have had the benefit of Dr. Tyndall's lucidity of exposition. Our friends across the ocean have flocked to hear and have appreciated the lectures which he has there delivered as a free gift to transatlantic science. But oral lectures, after all, the lectures at least of one individual, can only reach a fraction of the community; nor do they admit of that pause for thought which the learner requires in endeavouring to make himself matter of a new subject. But the same qualities of mind which enable a man to be a clear and interesting lecturer fit him also to be the author of eminently readable books; and for the general diffusion of science which is taking place we owe much to the writings of Dr. Tyndall. My lords and gentlemen, I fear that I have trespassed too long upon your time, and I will therefore now conclude by asking you once more to drink to the health of Dr. Tyndall. (The toast was drunk with great enthusiasm, the company rising.)

Professor Tyndall, in responding, said: When the project of a dinner was first mentioned to me by a very old and steadfast friend of mine, Professor Huxley, who, to my regret and his, is not here to-night, had any dream or vision of the assembly now before me risen on my mind's eye, I should have declined the risk of standing in my present position; for I should have doubted, as I still continue to doubt, my ability to rise to the level of the occasion. Gratitude, however, is possible to all men; and I would offer you, sir, my grateful thanks for the manner in which you have proposed this toast; I would thank with equal warmth an assembly which, in intellectual measure, is probably as distinguished as any of the same size ever addressed by man for the way in which they have received it; and I would extend my thanks to my friends of the Department of Science and Art for their spontaneous kindness to an old colleague, who for many years lent his humble aid to the department in diffusing sound scientific knowledge among the masses of the people. My own scientific education began late. It had, of necessity, to be postponed until after I had reached the age of 27 or 28. Notwithstanding this drawback, in learning, teaching, and working in a laboratory I have been permitted to enjoy a spell of 39 years. In 1850, during a flying visit from Germany to England, I stood for the first time in the bright presence of Faraday. In February, 1853, I gave my first Friday evening lecture in the Royal Institution; and three months afterwards, on the motion of Faraday, the old Chair of Natural Philosophy, which had been filled at the beginning of the century by Thomas Young, was restored, and to it I was elected. It causes me genuine pleasure to think that I shall be succeeded in that chair by so true and so eminent a man of science as Lord Rayleigh. It is not my intention to overburden you with egotism to-night; but, casting an earnest glance back upon the past, a few words seem due from me to the memory of one or two of the group of good men, no longer with us, with whom I was so intimately associated. Regarding Faraday, I will confine myself to stating that years have not altered my estimate of the beauty and the nobleness of his character. He was the prince of experimental philosophers; but he was more than this—in every fibre of his mind he was a gentleman. It is, however, of two of our honorary secretaries that I wish now to speak; premissing that for the first seven years of my life in the Royal Institution the post of secretary was held by a cultivated and very worthy gentlemen, the Rev. John Barlow. From 1860 to 1873—that is, for a stretch of thirteen memorable years—I had the happiness of working hand in hand with Dr. Bence Jones. Never in my experience have I met a man more entirely and unselfishly devoted to the furtherance of scientific work. I hardly like to mention the following incident, because it furnishes but a scanty measure of his devotion. On one occasion I was in need of funds to carry out some experiments of a delicate and costly character. Bence Jones came to me, and after some hesitation—for he knew that money was likely to raise a difficulty between us—he said with earnestness: —"Dear Tyndall, behave as my friend; do me the favour and the honour of devoting this to your investigation. There is more, if you need it, where that came from." He handed me a cheque for £100. Had I asked him for £1000 he would have given it to me; and the world, as far as he was concerned, would have been none the wiser. Bence Jones was a strong man, and liked to have his own way. At first, as was natural, we sometimes surged against each other. But these little oppositions were rapidly adjusted, and for many years before his death the tie of brother to brother was not truer or tenderer than that which united myself and Bence Jones. On my return from the United States I found him dying. In fact, the knowledge of his condition caused me to take leave earlier than I otherwise should have done of a people that I had learnt to trust and love. Soon after my return I saw him lowered into the grave. The death of Bence Jones, whose steadfast loyalty to the Institution he loved so well showed itself to the last, was a sore calamity to be met. At that time one man only seemed fitted to supply his place. That man was the beloved and lamented William Spottiswoode. To him I appealed to stand by the Institution at a critical hour of its fortunes. He had his own mathematical work on hand, and he was too well acquainted with the duties of our Honorary Secretaryship to accept them lightly. After much reflection, he wrote a letter to me regretfully but distinctly declining the office. But he reflected a second time. He knew that his refusal would cause me pain, and his affection for me prevailed. When, therefore, the letter of refusal—for he sent it to me—came it was accompanied by a second letter cancelling the refusal and accepting the post. With William Spottiswoode I had the happiness of working in close companionship for six years. The diligence, wisdom, and success with which he discharged his onerous duties, the princely hospitality which shed a glow upon the office while he held it, are well remembered. Of the dignity with which he afterwards filled the high position now occupied by the illustrious man who presides here this evening it is needless to speak. Him also we have seen lowered to his rest amid the grief of friends assembled to do honour to his memory. Such were the men who served the Royal Institution in the past, and their example has been worthily followed by other men of eminence still happily among us. Never was an institution better served than the Royal Institution; and not by its honorary secretaries alone. With singleness of purpose and purity of aim, its successive presidents, boards of managers, and honorary treasurers have unswervingly promoted the noble work of investigation and discovery. May they

never lower the flag which for well-nigh a century they have kept victoriously unfurled. The year after my appointment I was called upon to deliver, in conjunction with Dr. Whewell, Faraday, Sir James Paget, and some other eminent men, one of a series of lectures on scientific education. I then referred with serious emphasis to the workers in our coal mines and to the terrible perils of their occupation. I pointed to the intellectual Samsons toiling with closed eyes in the mills and forges of Manchester and Birmingham, and I said, "Give these toilers sight by the teachings of science, and you diminish the causes of calamity, multiply the chances of discovery, and widen the prospect of national advancement." Thus early, you will see, I was alive to the importance of technical education, and I am no less alive to it now. You will not, therefore, misunderstand me when I say that to keep technical education from withering, and to preserve the applications of science from decay, the roots of both of them must be well embedded in the soil of original investigation. And here let it be emphatically added that in such investigation practical results may enter as incidents, but must never usurp the place of aims. The true son of science will pursue his inquiries irrespective of practical considerations. He will ever regard the acquisition and expansion of natural knowledge—the unravelling of the complex web of nature by the disciplined intellect of man—as his noblest end, and not as a means to any other end. And what has been the upshot of science thus pursued? Why that the investigator has over and over again tapped springs of practical power which otherwise he would have never reached. Illustrations are here manifold. I might point to the industries which affiliate themselves with Faraday's discovery of benzol and with his discovery of the laws of electrolysis. But I need not go further than the fact that in this our day a noble and powerful profession has been called into existence by his discovery of magneto-electricity. The electric lamps which mildly illuminate our rooms, the foci which flood with light of solar brilliancy our railway stations and public halls, can all be traced back to an ancestral spark so small as to be barely visible. With impatient ardour Faraday refused to pause in his quest of principles to intensify his spark. That work he deliberately left to others, confidently predicting that it would be accomplished. And prompted by motives both natural and laudable, but which had never the slightest influence on Faraday, others have developed his spark into the splendours which now shine in our midst. It would be a handsome jubilee present if it were a possible one, to roll up the career of Faraday into portable form, and to offer it to the Queen as the achievement of one of Her Majesty's most devoted subjects during her own reign. Faraday's series of great discoveries, however, began in 1831, which throws his work five or six years too far back. During the rest of his fruitful life he was a loyal son of the Victorian epoch. But, passing beyond the limitations of the individual, what is science as a whole able to offer on the golden wedding of the Queen with her people? A present of the principle of gravitation—a handing over to Her Majesty of the bit and bridle whereby the compelling intellect of Newton brought the solar system under the yoke of physical laws—would surely be a handsome offering. I mention this case of known and conspicuous grandeur in order to fix the value of another generalization which the science of her reign can proudly offer to the Queen. Quite fit to take rank with the principle of gravitation—more momentous if that be possible—is that law of conservation which combines the energies of the material universe into an organic whole, that law which enables the eye of science to follow the flying shuttles of the universal power, as it weaves what the Earth Spirit in *Faust* calls "the living garment of God." This, then, is the largest flower of the garland which the science of the last fifty years is able to offer to the Queen. The second generalization is like unto the first in point of importance, though very unlike as regards its reception by the world. For, whereas the principle of conservation, with all its far-reaching and, from some points of view, tremendous implications, slid quietly into acceptance, its successor evoked the thunder peals which, it is said, always accompany the marriage of thought and fact. For a long time the scent of danger was in the air. But the evil odour has passed away; the air is fresher than before; it fills our lungs and purifies our blood; and science in its jubilee offering to the Queen is able to add to the law of conservation the principle of evolution. In connection with these victories of the scientific intellect, I have mentioned neither persons nor nationalities, holding, as Davy expressed it when the Copley Medal was awarded to Arago, that "science, like that nature to which it belongs, is neither limited by time nor space. It belongs to the world and is of no country and no age." Still it will not be counted Chauvinism if I say that in the establishment of these two great generalizations Her Majesty's subjects have quitted themselves like men. With regard to a third generalization neither England nor Germany has been idle. Omitting the name of many a noble worker in both countries, the antiseptic system of surgery assuredly counts for something in the civilized world. And yet it is but a branch of a larger generalization, of momentous import, which, in our day, has been extended and consolidated to an amazing extent by a Gallic investigator. To some, however, any flower culled in this garden will be without odour. Let me, therefore, add a sweet-scented violet, under the name of spectrum analysis, which, besides revealing new elements in matter, enables the human worker to stretch forth his hand to sun and stars, to bring samples of them, as it were, into his laboratory, and to tell us with certainty whereof they are composed. Surely all these and other discoveries of high importance, taken and bound together, form an intellectual wreath not unworthy of Her Majesty's acceptance in her jubilee year. A short time ago an illustrious party leader summed up the political progress of the Queen's reign. What I have said will, I trust, show that the intellectual world is not entirely compounded of party politics, that there is a band of workers scattered over the earth whose arena is the laboratory rather than the platform, and who noiselessly produce results as likely to endure and as likely to influence for good the future of humanity as the more clamorous performances of the politician. One word more. On the Continent of Europe kings had been the nursing fathers and queens the nursing mothers of science, while Republican Governments were not a whit behind in the liberality of their subventions to scientific education. In England we had nothing of this kind, and to establish an equivalent state of things we had to appeal, not to the Government, but to the people. They have been roused by making the most recondite discoveries of science the property of the community at large. And as a result of this stirring of the national pulse—this development of self-reliance—we see schools, colleges, and universities now rising in our midst, which promise by and by to rival those of Germany in number and importance. It is time that I should cease. But before doing so I would ask, as they do in the House of Commons, permission to say a word in personal explanation. I have climbed some difficult mountains in my time, and after strenuous efforts for a dozen hours or more upon ice, rock, and snow I have not unfrequently reached the top. I question whether there is a joy on earth more exhilarating than that of the mountaineer who, having achieved his object, is able to afford himself upon the summit a foaming bumper of champagne. But, my lords and gentlemen, the hardest climb by far that I have ever accomplished was that from the banks of the Barrow to the banks of the Thames—from the modest Irish roof under which I was born to Willis's Rooms. Here I have reached my mountain top, and you, God bless you! have given me a bumper which no scientific climber ever enjoyed before.

The Pharmaceutical Journal.

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IMPORTANT PROSECUTION UNDER THE PHARMACY ACT.

IN the case brought to trial before the Sheriff's Court in Edinburgh, the seven persons constituting the Leith Depôt, Limited, are charged with having infringed the 1st and 15th sections of the Pharmacy Act, 1868, by assuming and using the title chemist and druggist without being registered under the Act. For the information of our readers it may be stated that these seven unqualified persons carry on business at two shops in Leith, under the title of the Leith Depôt, Limited, chemists and druggists, and the view held by the prosecution is that by doing so they individually, as well as collectively, hold themselves out to the public *quâ* shareholders of the Company as being chemists and druggists within the meaning of the Act. Before the hearing of evidence in the case was entered upon a question was raised by the counsel for the defence as to the relevancy of the charge. This question involved a point of law which it was requisite to dispose of in the first instance, and it was contended that the charge above mentioned was not a good charge to make against a limited liability company. In support of this contention reference was made to the case of the Pharmaceutical Society *v.* the London and Provincial Supply Association, and the final decision of that case was appealed to as showing that the 1st and 15th sections of the statute do not apply so as to make an incorporated company liable to penalty. In reply to this portion of the argument in objection to the relevancy of the charge, the counsel for the prosecution pointed out that the charge was not made as against the Company, but that on the contrary particular care had been taken to draw out the complaint as against the shareholders of the Company as individuals. He contended that in this application the complaint was relevant, and that, indeed, if it were not relevant, it would be possible for any number of persons who wished to evade the statute passed for the protection of the public to set the law at defiance, and by simply associating themselves together, and calling themselves a company, to carry on the business of chemist and druggist independently of the special conditions prescribed by the statute in respect to legal qualification to do so. This is, in fact, what is being done by the seven persons against whom proceedings have been instituted, and in answer to the argument that it was evidently the intention of the statute to direct its provisions against persons, and not against a company or corporation calling itself chemists and druggists, it was contended by the counsel for the prosecution that if the language of the statute had provided that only a person is guilty of contravention who calls himself a chemist and druggist, it would have been open to anyone to start business and conduct the operations of chemist and druggist by saying, "I, JOHN THOMSON have no right to call myself chemist and druggist, but the name above my door is DAVID JONES, chemist and druggist," or as the judge remarked, he might call himself THOMSON and Co., chemist and druggist. Hence it was contended that there was in the present case a complete justification for asking a penalty in respect of a contravention of the statute to the effect of "taking, using or exhibiting the name or title of chemist and druggist," that being the offence for which the penalty was asked. The force of the argument that the using or exhibiting the name or title of "chemists and druggists" would in any case be an infringement of the law when the conditions it prescribes were not fulfilled, was still further illustrated by showing that if such were not the case, seven persons, not one of whom was individually able to carry on the business of a chemist and druggist, or assume the title, might coalesce in the shape of a limited company, with the remarkable result that, having so coalesced and registered themselves as a company, they would be able to evade that which they would otherwise have been unable to evade individually, by having seven shops conducted under the name of the company by the several individuals constituting the company.

As regards the argument based upon the assumption that the prosecution is directed against a corporation, and that the case should be governed by the decision in the London and Provincial Supply Association, the opinion was expressed that if that case had been a Scotch one, there might have been less difficulty, from the circumstance that Scotchmen are more familiar with the idea of a corporation being a *persona* perfectly recognizable in law. It was also pointed out that throughout the opinion of the Lord Chancellor, his difficulty was chiefly due to the consideration that a corporation cannot fall within the scope of the word "person," because a corporation cannot go through the course of education which is necessary, and cannot pass the examinations which are necessary in order to be qualified to carry on the business of a chemist and druggist. It was shown that so far from there being any attempt in the present case to enfold a corporation within the range of the word "person" the view laid down by Lord SELBORNE has been applied, and the complaint is not brought against the corporation to

which the above-mentioned inability applies, but against the individuals composing the corporation, of whom it cannot be said that it is impossible they should have passed the examinations required by the statute. The ample report published in this number of the Journal of the arguments on both sides as to the points of law raised by the defence renders it unnecessary to enter into them here at greater length.

At the moment of going to press we learn by telegram that the Sheriff has decided to repel the objection raised as to the relevancy of the first charge, as he holds that according to the judgment of the House of Lords the proceedings should be taken not against a company but against an individual wrongdoer, and that is just what the prosecutor has done in the present case. The report of the evidence given for the prosecution and of the speeches of counsel will be published in next week's Journal together with the judgment of the Sheriff.

It is interesting to notice that in the course of the argument of the counsel for the defendants it was repeatedly admitted that in the case of sales by a company the actual seller must be a qualified person. As regards the intention of the Legislature and as regards what must be admitted to be demanded by the public interest, it was fully acknowledged that the persons employed by a limited company to dispense and compound medicine and sell to the public should be duly-qualified chemists. It was even admitted that this is demanded by the law, and it was argued that if such men are put into the shops kept by companies it does not matter that none of the shareholders are qualified.

WINDING UP OF THE TRADE ASSOCIATION.

The untimely end of the Chemists and Druggists' Trade Association, recorded in this week's Journal, is an event that may most certainly be expected to furnish cause for regret in the future, if it does not at the present, among that large section of the trade from which no help to maintain its existence has been rendered, but we think the members of the Executive have acted wisely in declining to continue any longer the responsibilities attaching to their position without corresponding support from those whose benefit was the object of their exertions. At the time when the Association was formed we took occasion to point out that the first and most essential condition for its success was that it should have the active support of the great mass of the trade. The very moderate amount at which the annual subscription of a member was fixed ought to have commanded such an accession of members as would have made the Association really representative. But the experience of the past eleven years has been in this respect disheartening in the extreme and, while justifying the worst prognostications, has furnished evidence of a thorough want of public spirit and capacity for combined action among a large part of the chemists and druggists of this country. It may therefore be doubted whether the project of starting a Chemists' Defence Agency undertaken by Mr. Haydon, the late Secretary of the Trade Association, has a very promising future before it. It is not saying much to wish him at least a better fate than the Association he has so ably served, but with every desire to see him successful in his undertaking we cannot with past experience before us be very hopeful as to the result. The subscription for membership is a very moderate one for securing the advantages which a combination of the kind ought to provide. Naturally under the circumstances the ordinary course of the operations of the agency will be restricted to defence of its members only, and probably this limitation of activity may be beneficial. In any case, Mr. Haydon and those who become members of his agency will have the advantage of the hearty co-operation of Mr. Glaisyer, who has, throughout the existence of the Trade Association, been actively engaged in the work carried on by it, and has, in the capacity of Solicitor, had great opportunity of acquiring a practical knowledge of the trade and its requirements. We trust that they will receive all the support their energy and abilities entitle them to look for.

We learn from a correspondent in Edinburgh that Professor Fraser has been engaged in an investigation of the Chemistry of Strophanthus, which is now so nearly completed that we may expect before long to see his results published. The favour with which this drug has been received certainly makes it desirable that its administration should be based upon a much more thorough acquaintance with its active principle than we have hitherto been in possession of, so that it may be possible to produce tincture or other preparations of determinate strength and suited for being used with the regard for precision that is so necessary with a drug of such potency.

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According to the *Lancet* the large sum of ninety thousand dollars is expended annually in the island of Cuba on chemical analyses for medico-legal purposes. These examinations are generally conducted by pharmacists acting under the authority of magistrates; but it is alleged that many of the persons into whose hands the work falls have a very imperfect knowledge of chemistry, and that even the good faith of some of them is open to suspicion. The Royal Academy of Sciences of Havana has recently presented a memorial to the Governor-General on the subject, and it has been suggested that a really efficient institute under the charge of a competent chemist, with two assistants, one a pharmacist and the other a medical man, could be maintained for about one-eighth of the present cost.

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The School of Pharmacy Students' Association will hold its anuual meeting to receive and consider the report of the Executive Committee on the past session, etc., on Thursday, July 7. The President, Professor Attfield, F.R.S., will take the chair at 7 p.m.

Chemists and Druggists' Trade Association of Great Britain.

DECISION TO WIND UP THE ASSOCIATION.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on Monday, June 27, at 1 p.m., for the purpose of considering the practical effects of the following resolution passed at a Special General Meeting of the members of the Association held in London on the 17th inst.:—"That the Association with a subscription of half-a-guinea per annum be carried on for twelve months, and that the present Executive Committee be requested to continue their efforts to sustain it." Mr. W. G. Cross (Shrewsbury), President, in the chair. Present, Mr. J. Maltby (Lincoln), Vice-President; and Messrs. Bell (Hull), Barclay (Birmingham), Chapman (Scarborough), Hampson (London), Holdsworth (Birmingham), Jervis (Sheffield), W. Jones (Birmingham), Parker (Nottingham), and the Solicitor af the Association.

The following letters were read from members of the Executive:—

From Mr. J. Harrison, Sunderland:—

"My dear Cross,—I am not sure that I shall be able to get to Birmingham next week, as Monday is a very inconvenient day for me to be away, but I shall make a strong effort to be present both at the formal meeting at 1 p.m. and at the informal meeting at 12·15.

"For fear I should not be successful in my attempt to get away I will now fully give you my views of the situation.

"I think you have done wisely thus early to call the Executive together, but unless there is some information to lay before them, that I am not in possession of, I do not see what you can do except to restore the *status quo* by returning to the point we had arrived at when some of our friends broke away.

"When last at Birmingham, after very full consideration, we arrived at the conclusion, that notwithstanding the fact that 1400 chemists had, in response to our appeal, promised in writing to remain with the organization, the time had now come when the existence of the Association must come to an end. We gave a respite by postponing the meeting at which this decision was to be carried into execution for three weeks, so that, should there be others minded to support us we might give them another opportunity; and you know with what result. Then when we present ourselves to the meeting in London, at the instigation of men who displayed their incapacity to grasp the amount of work done by the Association, by the simplicity of their suggestions for its future working, we are asked to turn our backs on our former conclusions, and try again, not with 1400 men pledged to support us, but without a single man so pledged. We have no right to assume that these 1400 will now join, and I do not think that now, except in very few instances, they will do so.

"The trade fail to recognize the necessity for our existence, and as a matter of course do not go with us. I lay little stress on the tall talk of some of the speakers at our last meeting; but I do lay very seriously to heart the fact that in a city where chemists number 1200 men, only some twenty could be found to attend the meeting to prevent our extinction, and very few of these could be considered to represent anything beyond themselves.

"I am in favour of the necessary steps being at once taken to wind up the Association, and the present time is eminently suitable for that purpose, as we have now in a fashion completed our year, and the members have no further claim against us."

From Mr. Charles Symes, Liverpool:—

"Dear Sir,—I regret that business engagements which cannot be postponed will prevent me from being present at the Executive meeting on Monday.

"As you invite those who cannot attend to express their views in writing, I beg to submit the following:—

"That after careful consideration I am still of opinion that it is impracticable to carry out the resolution passed at the Special General Meeting held in London.

"That resolution says in effect 'Go back and try what you can do for another twelve months by doubling your subscription. You will, it is true, have decreased numbers and less representative, but having about the same income as you have had of late, and by continuing to persevere, you may struggle on for one more year.'

"Now every member of the Executive knows quite well that we have been face to face with this position for two or more years, and that we have been doing our best to meet it with the too well known result. If it could be shown that there were some specially favourable conditions about to operate during the coming year which we have not enjoyed in the past, there might be some grounds for even a forlorn hope, but I am not aware of any such. It was mentioned that the majority of the Executive who voted for winding up the Association was exceedingly small, but if my memory serves me correctly there were several who did not vote, chiefly on account of the exact form of the resolution, and not on account of the result involved; had it not been for this, the majority would certainly have been larger. In fact, every member of the Executive must be aware that on existing lines and with half-a-guinea subscription of about 1400 members, the Association cannot go on. We all regret the fact, and this regret is so strong that it becomes sentiment and tends to obscure our better judgment.

"In my opinion the Association is dead. Do not waste energy in a fruitless attempt to resuscitate, but cremate it, carefully store away its ashes, so that if in the natural course of events the necessity asserts itself a new association may rise from its ashes, and become more powerful and more useful than the present. With these convictions, and with much regret, I have to tender my resignation as a member of the Executive. With thanks for the uniform courtesy which I have at all times received from yourself, the Executive generally, and the officials of the Society."

From Mr. C. J. Arblaster, Birmingham:—

"Dear Sir,—Finding that my notice of resignation as a member of the Executive of the Chemists' Trade Association was only thought to apply to my post of Honorary Secretary, I now beg to say that I decline again to serve on the Executive. With thanks for the courtesy extended to me by all the members and officials of the Association."

From Mr. Frederick Andrews, London:—

"My dear Sir,—I fear that I shall be unable to attend the meeting on Monday, though it is my intention to be present if possible.

"It is quite evident that the Association is in a very critical state, as many of those who have promised to pay the 10*s.* 6*d.* per annum will probably say that it was contingent upon the expenses being materially reduced; this is absolutely necessary on every ground, and it will be one of the first duties of the Committee to see how that can best be done. Any suggestions I could make on this point will, I know, come from others, and therefore I refrain from troubling you with them. I shall be very pleased to serve on the Committee again, if thought desirable, but the working of the Association should be in as few hands as possible. Our Executive is in my opinion too large—a General Committee as large and representative as possible—the working bees not too numerous.

"These are the most salient points that occur to me, and I give them in deference to the wishes of the President, and I would only add what I have said before, that some kind of prominence ought to be given to London to endeavour to satisfy wishes that I have heard expressed again and again.

"Could not your Vice-President or Honorary Secretary be a Cockney?"

From Mr. GEO. WALKER, London :—

"I am sorry to say I shall not be able to be present on the 27th. As regards the future I shall be pleased to act on Executive, if any *modus vivendi* can be found, but personally I think, with the painfully inadequate response made to the application by the trade, it is not practicable to go on. Certainly the number of Executive will have to be reduced, and as Scotland seems to take so little interest in the society (judged by its subscription list), the Scotch names might fairly be withdrawn, and also the representative from any other district considered to be over represented. So far as I can see, the only course to be adopted in view of the London resolution is to appeal to the Local Secretaries, and also to those present at the meeting (whether Local Secretaries or not), to make another canvass, and if by a fixed date, say August 1 or 31, the £1000 is not forthcoming let the Association expire by effluxion of time.

From Mr. OWEN JONES, Llanrwst :—

"Dear Sir,—Receiving your circular letter only this morning, and the Executive meeting to-morrow, I am forced to reply to it to-day (Sunday), which is much against my practice.

"I fully intended coming to Birmingham, but after receiving this I have made up my mind to stay at home.

"It appears to me that those gentlemen who were foremost in advocating and supporting the Association from its commencement are now determined to abandon all efforts towards placing it on a new and sound basis. Why not issue a circular to the 1400 who are willing to become 10*s.* 6*d.* subscribers, calling for the money which will be due on the 1st of next month?

"Appoint a treasurer, instead of Mr. Holdsworth, to sign cheques and receive money.

"I am quite willing to act on the incoming Executive if it shall be their wish, and also to canvass, and that at my own expense if I am not successful; if you will send me some more of those circulars (scheme of organization) I shall be glad. For goodness' sake do not kill the Association before it is dead, to please the Pharmaceutical Society or anyone else."

From Mr. H. CROOK, Eastbourne:—

"Dear Sir,—I much regret that the early hour fixed for the meeting on Monday will quite prevent my presence.

"With regard to the present position of affairs I am strongly in favour of carrying on, and if possible extending the work of the Association. I much regret that, owing to illness in my family last year, I was unable to take my share in the work, and am quite prepared to continue in office for the ensuing year, and will do my best to attend the meetings. I am of opinion that a canvass of each district by the Local Secretaries with the authority of the Executive would result in a large accession of strength. It was my intention to have spoken at the meeting last Friday, but I was compelled to leave early in order to catch the 5 o'clock train from London Bridge."

From Mr. JAMES MACKENZIE, Edinburgh:—

"My dear Sir,—In reply to your circular of the 20th inst., I am willing to serve on the Executive of the Chemists and Druggists' Trade Association of Great Britain for another year. I shall be unable to attend the meeting called for Monday. As to my views upon the present position of affairs, I may state that I do not quite understand the present position of the Executive, unless it be that by the action of the meeting held in London on the 17th, they are elected, and that to them is left the power to do all they can for the Association. I trust, then, that caution and economy will be fully considered and acted upon. That new names shall be at once proposed for the office of Honorary Secretary and Treasurer, that office expenses shall be reduced, and a new Assistant-Secretary at a reduced salary be engaged, with less outlay for reporting. That only members shall be defended, and cases failing to be dealt with by us be reported to the Secretary of the Pharmaceutical Society, be published (should any of this class of cases be reported to us by members), that no outlay be gone into in the way of finding evidence.

"And generally that the efforts of every member of the Executive shall be put forth, in order to see whether the Association is really wanted by the trade, at the same time to reduce our expenses by all means, where this can be done, and upon no account to have these only or chiefly upon the ground, that they existed before. That a strongly worded circular be sent to all Local Secretaries in order that means may at once be taken to enter new members.

"For Scotland I fear that our different circumstances will be more against us, unless we make up our minds to rouse the Pharmaceutical Society (and do it) to undertake much more of its real duty to its members."

From G. S. S. LAIRD, Edinburgh:—

"My dear Sir,—The only way of practically carrying out the resolution of the meeting of the 17th, is for every member of the Executive, and more particularly the Local Secretaries, to do all in their power to get new members, a line of conduct which I shall do all in my power to act up to here. I am not at all sanguine as to the result.

"It was very hard work to get 5*s*, but it will be something like impossible, I fear, to get 10*s.* 6*d.*

"I shall be willing to act on the Executive for another year and see the end of it.

"Will not be at the meeting on Monday."

The minutes of the previous meeting of the Executive were read and confirmed.

A letter was read from the Editor of the *Chemist and Druggist* asking that a reporter might be admitted to the meeting to take a note for that journal.

The Secretary said that the reporter was in attendance awaiting the decision of the Committee on the matter.

After some little discussion it was decided that the reporter of the *Chemist and Druggist* be admitted, which decision was communicated to the reporter and he then entered the room.

The President then said that it was with feelings of very considerable regret that he rose to move the following resolutions :

"That the Executive, having carefully considered in all its bearings the practical effect of the resolution passed at the Special General Meeting of the members of the Association held in London, on June 17th inst., is of opinion that it is absolutely impracticable to continue to carry on the work of the Association, and they therefore decline to accept the responsibility which such a course would entail.

"That the books and documents of the Association, so far as they relate to financial matters, be placed in the hands of the auditors of the Association forthwith, and that the auditors' statement be transmitted to the trade journals for publication without delay.

"That the funds in the hands of the bankers of the Association be transferred to the auditors of the Association forthwith, with instructions to discharge the liabilities of the Association so far as those funds permit, and to levy, *pro ratâ*, on the members of the Executive for the balance required."

He was sorry it had fallen to his lot, as the President of the Association, to have to submit a proposition of that character, and if he saw any way out of it he certainly should not move it. If by any exertions on the part of the Committee or himself it would have been possible to have carried on the work of the Association in anything like a satisfactory manner, the Committee, he was sure, would have been delighted. The position of the Association was so fresh in the memory of everyone present that he was sure he need not enter into a lengthy recapitulation of the way matters stood. He felt, along with his colleagues, that the course they were about to adopt that

day was the only feasible one. On Friday next their duties as the elected members of the Executive ceased. Every new subscription that they collected after that date to apply to purposes beyond that date landed them in a fresh responsibility, and that responsibility was to carry on the work of the Association for another year. Not merely to carry it on for a few months, or as long as the money lasted—because as honourable men they could not receive one single deposit from the chemists of the country without carrying out their obligations to their fullest extent. Looking, therefore, at what had taken place they were not justified in asking for further subscriptions. As simple men of business, putting sentiment altogether on one side, because in business transactions they must not let sentiment weigh with them, they must decline to take the responsibility the future carrying on of the Association would involve. They would remember that in February last they were so short of funds as not to have sufficient to pay the accounts they then owed. They met together, and he doubted whether some of them, when they left that room, were not considering in their own minds whether their hands would not shortly have to go into their own pockets to help to supply the deficiency they were then suffering from. But the Secretary, who had received certain instructions from the Committee, sent out a circular which he (the President) would say nothing about, either on its merits or its demerits, but he would merely speak of its results. Its result was that they were provided with sufficient funds to keep them on to the end of the year. When those funds came in, in a perfectly business-like way the Committee resolved that that sort of thing must not occur again, and in order to prevent it they appealed to the whole of the trade to support the Association more largely in the future than they had done in the past. After very great care they drew up a scheme of re-organization and asked the members of the trade if on that re-organized basis they would support the Executive in carrying on the work of the Association. He thought he should mention that the Executive agreed amongst themselves at the time that unless they had an income of £1000 a year, that was unless 2000 members of the trade subscribed to their funds, they were not justified in going on. What was the result? They had 1400 promises. Then the Executive came together and after deliberation came to the conclusion that that was an inadequate response. They called the meeting in London, and moved a resolution at that meeting stating that they considered the response inadequate. He did not wish to cry that meeting down at all. They met some of their very good friends; they were, if possible, friends who were too good. They were friends the Association required saving from, because, although very enthusiastic, their opinion was not of sufficient weight to cause the Committee to undo what they considered they had rightly done before. Therefore when the Committee got to the meeting at London they found the members of the Association so full of goodwill towards them that they moved an amendment to the Committee's winding up resolution and asked them to give the Association another chance. Well, practically they had given the Association another chance. They had waited for a considerable time before calling that meeting. He did not say there had been much opportunity for canvassing, but if the trade was so red-hot and fervently anxious to support them they would have expected to have received at the office more promises of support. But what was the actual fact? It was that they had received no extra promises of support, and that they had to rely on the 1400 promises they had previously received. Therefore, looking at all these matters, he felt sure that they, as an Executive Committee, could not be otherwise than fully justified in coming to the conclusion they had. It was with feelings of great regret that he had come to this conclusion. He, as President of the Association, as captain of the ship, had a great reluctance to founder the vessel. He and those who had worked with him were as anxious as ever for the success of the undertaking, but seeing that it was impossible to carry on, they wished to say to the trade in the most emphatic manner possible that they left the responsibility in their hands. They felt they had done their duty. They did not acknowledge for a moment that they had failed. They were not ashamed of the old lines upon which they had gone, because it could not be said that they had ever turned a proper case away. All they could say was that the funds falling short they did not consider themselves justified in spending their own money with the chance of it being asserted in the near future that they merely wished to stick to office. What the Executive wanted to do was not to stick to office but to defend the interests of the trade, and as they could not do that unless the trade found them the necessary funds they must relinquish their duties. Therefore, he regretted to move the resolution which embodied the remarks he had made.

Mr. Holdsworth said it was with no degree of pleasure that he rose to second the motion. Probably the trade would regret hereafter that they had failed to respond to the call of the Executive for additional help. He considered the Association had done good work in the past. They had erred, if at all, in an excess of zeal. He thought if any charge could be brought against them it was that they had gone beyond the limits of the very strictest and hardest lines of prudence in defending their members. They had done as much as ever they could, he believed, as a Trade Association, in helping their members. They had successfully stood up on their behalf when attacked from various quarters, and the trade owed the Association a very great debt of gratitude. He was very much disappointed at the response which came to their last appeal. He had hoped they would have reached 2000 promises. If they had received 2000 he considered they might have risked the experiment of continuing the Association, but when they took it into consideration that only about half the existing members of the Association, the number of members of which had dwindled down from 4000 to 2200, had responded to the circular, it would be seen that there was a lamentable lack of interest in the working of the concern. Therefore, notwithstanding the resolution of the meeting in London, accepting the wisdom of it as far as the wisdom might be, and he dared say would be, explained by the mover, he still felt that the Executive were not justified in accepting the responsibility which the meeting in London asked them to undertake. It must not be forgotten that that meeting consisted of a very small number of representatives of the trade in the provinces. Only sixteen members outside of London were present, besides the members of the Executive, and while he should be very much disposed at all times to give the greatest attention to the resolution passed, nevertheless the constitution of the meeting could not be overlooked. If the gathering had consisted of 200 or 300 men, who at some considerable trouble to themselves had come together to consider the position of the Association, it would have had greater weight, but he felt perfectly sure that any attempt on the part of the Executive to carry out the resolution of the meeting would land them in not a trifling responsibility, if not in disgrace. They would take money from their constituents and find before the year was out that they would not be able to fulfil their obligations. Their duties as far as he could see were clear and definite. They should, at the earliest possible opportunity, discharge all liabilities which rested upon them and close the affairs of the Association. It was a matter of great regret to him because he felt that the trade would shortly be very sorry at this result.

Mr. Hampson said that what he had to say that day was somewhat in self-defence. It would appear from the expressions of opinion he had heard from one or two

members of the Executive, that the resolution or amendment carried at the London meeting did not savour very much of wisdom. The position he took up was simply this :—An amendment had been moved which was thoroughly impracticable. It was a useless amendment, and could not have been in any way beneficial to the winding up of the Association or otherwise. He came in as it were at the breach to save that amendment from becoming a substantive resolution. He must confess that at the time he had a faint glimmering of hope remaining, and that day he should have been ready to carry on the Association if there had been a general feeling amongst his colleagues that the thing was at all practicable. He could see clearly enough that it was not practicable. The Executive must now fully relieve themselves of all responsibility and throw the responsibility on the trade. The trade had not responded as it should have done to the wants of the Association for a very long time past. They had for a considerable time found that their actions had to be limited and their energy stunted through the want of the necessary means to push forward in a proper and satisfactory way the work of the Association. This was no new feature, for even the much older body, the Pharmaceutical Society, felt the same thing. He considered it was necessary the trade should know and feel the want of an association. It was only by thoroughly feeling this want and by being attacked by analysts, unnecessary legislation and the various dangers likely to beset their calling, that chemists would realize the necessity of bringing into vogue a new association.

Mr. Maltby (Vice-President) said it was with great reluctance that he rose to support the motion. He came there that day perfectly unbiassed and perfectly willing to accept any reasonable *modus vivendi*. He had reluctantly, however, been forced to the conclusion that there was no alternative but to bring matters to a close. If at any future time a new association was started it would have his most earnest support if he saw any reason for its success. He thought they should bury their child decently that day and not suffer any grief for the future. They had had many pleasant meetings together, and had benefited, he thought, by their various discussions. It was, then, with very great reluctance that he supported the motion.

Mr. W. Jones (Birmingham) remarked that, as one of the oldest members of the Association, he quite agreed with all that had been said. He had seen the inner working of the organization, and knew that unless they had 2000 subscribers, and there did not seem the slightest probability of getting that number, the best thing to be done was to wind up the concern. He had always been of opinion that the subscription was too low. Eight or nine years ago he put a motion on the agenda that it should be raised to a guinea, but it was thought better that they should be numerically strong than financially strong. They had, however, seen by the resolution now proposed, the wisdom of the proposal he then made. He quite agreed with his colleagues in the course they were taking.

Mr. Jervis said that after the affecting speech of the Vice-President, he thought there was very little more to be said. They could simply now make up their minds to bury the poor child of which he had spoken so affectionately. He hoped, if they were spared by Providence to have another child, he would be far more strong and healthy and have a better constitution than the child they had been in possession of.

Mr. Bell expressed regret at the conclusion they were bound to arrive at that day. He fully endorsed every remark that had emanated from the other members of the Executive, and felt sure that the trade, by the death of the Association, were suffering a very great loss and losing valuable assistance. It had been the means of bringing together men—especially those in the country towns—who otherwise would have been separated. The Association had been a great advantage in that respect, and he hoped, if another association saw the light, it would have a stronger constitution than the dying one. He again desired to express his regret at the position in which they found themselves.

Mr. Barclay commented upon the apathy which had distinguished the chemists and druggists throughout the kingdom, because he found that since their meeting in London, and ten days had elapsed since then, they had only got two additional members.

The Secretary : Promises.

Mr. Barclay : Two additional promises. There did not seem to him any possible chance of the Association being successfully re-organized even for twelve months. That being the case it would indeed be a very wrong thing for the Executive to collect subscriptions from any of the members, because if they could not carry on for twelve months they would be acting very wrongly to the subscribers. The amendment which Mr. Hampson moved in London was moved with the expectation that the members of the trade would respond, and respond promptly. The meeting, although small, was enthusiastically in favour of the Association being continued. It was expected that those members present would so have acted as to secure, by this time, a considerable number of promises. He considered that very likely that would be the last meeting of the Executive. The working of the Association for the past eleven years had been a very arduous, but a very clever, task. He had met many gentlemen whom he now might number among his friends, and in that respect their association together had been productive of pleasantness. It was something to feel proud of, that they had worked together so amicably all these years, and that there had never been any friction between them. Those who had passed away, either by death or through engagements, had left them with pleasant memories and retrospects ; and at the present time there were members on the Executive who had served in that capacity from the very commencement. The severing of these friendships would be very painful. They would, he had no doubt, meet in the future in some way to promote the advancement of the trade, because the Executive were not winding up the Association because of their lack of interest in trade matters. He was glad to know that the deficiency would not be a very large one, that about £1 a head would cover the deficit. It was better they wound up before their liabilities increased, considering the large number of absentees that day, the number of those who had sent in their resignations, and the opinions expressed by his friends round him; although of a more sanguine temperament than some other of the members of the Executive he should, nevertheless, support the motion, because in the state of affairs it was the only thing practicable.

Mr. Chapman said he extremely regretted that there was no course open to them but to wind up.

The resolution was then put to the meeting and carried unanimously.

Mr. Jervis said he felt it his duty to apologize for the absence of his Scotch brethren. He very much regretted to see that there was not a single representative there from Scotland. It was somewhat strange. He thought the members of the Executive present thoroughly regretted they had not come to see the closing scene. He should like that reported, because he thought it important.

The President said that a letter had appeared in the *Chemist and Druggist* from Mr. Glover.

Mr. Glaisyer said the answer to Mr. Glover's letter was really this : he was charged with having committed certain acts in the course of his business that infringed the provisions of the Apothecaries Act. His action was carefully examined by the Secretary, and the facts laid before him (Mr. Glaisyer). He said it was quite clear Mr. Glover had not done more than chemists claimed a right to do, therefore on that account

he should advise, apart from other surroundings of the case, that he be defended. But they had to face the important facts in connection with the case, that the child died. Now, as far as they had been able to gauge the opinions of the Court with regard to chemists practising across their counters, it was that while a chemist had a right to practise he took the risk of whether the disease for which he was prescribing was dangerous or not. The fact of the disease in Mr. Glover's case being serious was practically proved by the fact that the child died. Therefore, supposing they went into court, and that Mr. Glover had not done anything more than he had a right to do, they had the uphill fight before them that he had attended to a dangerous disease. In the present position of affairs he (Mr. Glaisyer) could not advise the Committee to defend that action, whilst at the same time he could not advise Mr. Glover to apologize for what he had done and not do it again.

Mr. Barclay: Did not you advise him to apologize?

Mr. Glaisyer: No I did not, and I could not, because he did no more than chemists claim a right to do. The prescription for the child was prepared upon the representation of the child's mother. Mr. Glover did not see the infant.

The President said that he had received two letters showing that the Apothecaries' Society was very busy just now. He considered Mr. Glaisyer's explanation was perfectly clear and reasonable. He then read letters from two chemists residing at Abergavenny intimating that they were threatened with legal proceedings by the Clerk to the Society of Apothecaries for acting as apothecaries.

Mr. Hampson said he should sustain the Executive in refusing to defend a chemist if he had thought proper to prescribe in the case of a dangerous illness.

The President said he thought they should not separate without moving a resolution similar to that carried in London respecting their Secretary and Solicitor. He thought the Committee ought to thank those gentleman very heartily for the pains they had taken during the existence of the Association to carry out the objects of the organization as beneficially and fully as possible. If they would allow him he would propose a resolution to that effect. He had the highest opinion of their capacity for doing the work, and the highest opinion of the manner in which that work had been performed. He thought he was speaking not only on behalf of the Executive and himself, but giving the opinion of chemists and druggists throughout the whole kingdom, when he said it would have been impossible for anybody to have done the work better than Mr. Haydon and Mr. Glaisyer had done it. He thought the best thing the Executive could do was to give those gentlemen the most cordial vote of thanks it was possible to pass. He therefore proposed—

> "That the Executive Committee desires to record its deep sense of the valuable services rendered by Messrs. Haydon and Glaisyer, the Secretary and Solicitor of the Association, for the intelligent, courteous and earnest manner in which they have striven to carry out the objects of the Association."

Mr. Bell seconded the motion. He said Mr. Haydon and Mr. Glaisyer had always been thoroughly attentive to the work of the Association, and had always behaved with the greatest courtesy. He regretted very much parting with them that day, and trusted their efforts in the future, whatever they might be, would be crowned with success. He had very great pleasure in seconding the resolution.

Mr. Barclay said everybody knew he could cordially support the motion. He had become personally attached to these two gentlemen after many years of pleasant and continued intercourse, and he trusted he should retain their friendship for many years to come. They had both proved themselves to be most able and intelligent officers. There had been difficult and intricate cases to deal with, and they could not have been able to have steered their barque so skilfully unless they had had the advantage of the services of those gentlemen.

Mr. Hampson felt very sorry he should not have the pleasure of meeting their Secretary and Solicitor in the future as he had done in the past. They might, however, perhaps have the opportunity of being together again. He cordially supported the motion. He thought it was not only fair, but absolutely necessary that they should pass it, and he hoped the undertaking those gentlemen were about to enter into might be successful, and would receive good support from members of the trade.

The motion was carried unanimously.

Mr. Haydon said he thanked the Executive heartily for the resolution they had just passed. After ten years, he might say eleven years, of faithful service, it was not a little hard to part in this way. But he did not think it would be said that the work accomplished by the Association had by any means been thrown away. They could not look back upon those eleven years' work without a great measure of satisfaction. All had pulled together to carry through the work which lay before them. He came to the members of the Executive eleven years ago an utterly unknown man, and it would, at all events, be no little satisfaction to him in looking back at the history of the Association to know that he left the services of the organization with a great many firm personal friends. Since he undertook the position of Secretary he could honestly say that he had left no stone unturned to carry out the work it involved to the best of his ability. He felt it his duty to add that he thought the decision they had now arrived at was a wise decision. He believed the Association on its present lines was as dead as Queen Anne. He did not consider he should be out of order if he added that it was his desire to put his services at the disposal of the trade in a somewhat similar capacity to that in which he had hitherto worked, and he hoped by that means to continue his connection with the members of the late Association, including many old friends residing in various parts of the country.

Mr. Glaisyer said, eleven years ago, in making application for the post of Solicitor to the Association, he said he desired to leave his merits in the hands of those gentlemen who knew him best; he was prepared to take the same position that day. In becoming Solicitor to the Association he was introduced into a fresh line of practice, and a line which he very much enjoyed. Their cases had afforded him immense interest. He had found many new acquaintances and friends amongst the chemists and druggists of the kingdom, and he should look back to his connection with the Association with very many pleasant recollections.

Mr. Jervis said that, as one of the members of the Executive from the commencement, he should like very much to tender Mr. Haydon and Mr. Glaisyer his thanks for the excellent way in which they had performed their duties. He did not think the Executive, if they had searched England over, could have found a better Secretary, and as for their Solicitor they were satisfied with him. That was saying a good deal for a solicitor. But both had done excellent work in the interest of the Association.

Mr. Barclay then moved a vote of thanks to the President. He remarked that Mr. Cross had had a very difficult task. Presidents in the past had had to deal with an Association which was zealous and vigorous, but their retiring President had held his position during a most trying time.

Mr. Hampson seconded the proposition. Mr. Cross, he remarked, had been very unfortunate in occupying the chair at the time of winding up. The last few months must have caused him a great deal of anxiety, and he had not had his fair share of the pleasure attached to the office.

Mr. Holdsworth supported the proposition. He said he hoped it would not go forth that the captain had

scuttled the ship. The vessel had in reality been deserted by the crew. A captain could not go on without a crew, and if a crew could not be got together the captain must resign.

The motion was then put and carried unanimously.

The Chairman, in reply, thanked the members for their kind appreciation of his services, and said that he should be most willing to come forward again in any capacity which would be of service to the members of the trade.

Some discussion took place at the close of the meeting as to the best and least expensive means of communicating to the trade the collapse of the Association; and eventually, at the request of the Executive, the Secretary undertook at his own cost to circular every member of the retail trade, announcing the fact at the same time that he distributed prospectuses of the agency he intended to establish.

The President, Vice-President, and many members of the Executive then handed to Mr. Haydon their subscriptions to the agency, and expressed their good wishes for its success.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, June 23, the chair being taken by Mr. E. White.

The proceedings commenced with the following—

Note on a Sample of Green Olive Oil and a Test for Copper Therein.

BY J. OLDHAM BRAITHWAITE.

The discussion which has lately taken place with reference to the official liniment of turpentine has directed attention to the varying physical and chemical characters of those samples of commercial soft soap which are supposed to be made solely from olive oil and potash, and are distinguished by the mark "B.P." This has naturally led manufacturers to inquire into the matter, and it is evident that variation could only arise from three sources; the manipulation, the alkali, and the oil. It is with the last of these that I have to do at present.

A few days after the publication of Professor Redwood's paper on "Linimentum Terebinthinæ and Sapo Mollis,"* I had occasion to examine samples both of a green olive oil recommended for the purpose of producing a green soft soap and of a green sapo mollis, and both oil and soap contained copper in considerably more than traces.

At the subsequent Evening Meeting in April a sample of green olive oil employed in the manufacture of green soft soap was exhibited by the Chiswick Soap Company. Having mentioned my recent experience with the other samples Mr. Holmes was good enough to hand me a little of this oil for examination.

In the meanwhile I found that when pure olive oil is heated with bright copper for twenty minutes at about 220° F. it speedily assumes a deep green colour, similar but not exactly identical in tint with the Chiswick sample. At first, finding the direct application of reagents for the detection of copper in oil to give unsatisfactory results, I had recourse to incineration, employing about 50 grams of the oil. The ash thus obtained gave a deposit of 8 milligrammes of metallic copper when treated by the electrolytic method. These figures however are valueless from a quantitative point of view, the process of burning not being sufficiently manageable and very tedious. Casting about for a simple direct test I have found the following application of the familiar ferrocyanide reaction to give satisfactory results:—

Pour about 10 c.c. of solution of potassium ferrocyanide into a test tube and add to it an equal volume of oil. Shake well for a few minutes and allow to stand. If copper be present a bright reddish pink precipitate is formed at the juncture of the two liquids in from one to twelve hours, according to the amount of the metal present.

In order to test the delicacy of the reaction it was found that when five milligrammes of pure dry oleate of copper (equivalent to 0·00056 gram Cu) were dissolved in 100 grams of oil a distinct reaction was given by this test in twelve hours.

Upon applying this test to the Chiswick sample an abundant indication of the presence of copper was obtained, which was subsequently confirmed by incinerating another portion of the oil and precipitating the metal by electrolysis.

It will be noticed, however, that there is this difference between the Chiswick sample and the oil coloured with copper by myself. In the latter when the ferrocyanide reaction is complete, the supernatant oil is nearly colourless, whereas, in the former, the upper liquid retains a part of its green colour. Being aware that compounds of chlorophyll and copper are readily formed, as seen in many pharmaceutical preparations where due care is not taken to avoid contact with that metal, and that these chlorophyll copper compounds have even recently been proposed for use in dyeing textile fabrics,* it naturally occurred that possibly this was what was present. Not having access to a spectroscope, my friend, Mr. Short, kindly undertook to submit a sample to spectroscopic examination. He informs me that it gives no marked indication of the presence of that body.

Wishing to avoid the tedious process of incineration in the case of soft soap, I have found the following modification of this test to work very well:—

About 25 grams of soap is decomposed by heating with a slight excess of acetic acid; the supernatant oil is separated and washed in the usual manner, then well shaken with an equal volume of solution of ferrocyanide of potassium. In a few hours the indication of copper, if present, will be evident, although from traces of iron usually present, the colour of the precipitate is not quite so bright and clean as in the case of the oil.

My thanks are due to Messrs. Wright, Layman and Umney, in whose laboratory I have applied these tests.

The paper was followed by a discussion, in which the Chairman, Secretary, Messrs. Millard, Bird and Thomas took part.

The following Report on Pharmacology was then read by the Secretary in the absence of the author:—

The Estimation of the Alkaloids of Conium Maculatum.

BY R. A. CRIPPS.

The estimation of the active principles of drugs and their preparations is a subject of vast interest to all concerned in the practice of medicine or pharmacy, and has already engaged the attention of numerous investigators, particularly Messrs. Dunstan, Short and Ransom, who have perfected excellent methods for assaying nux vomica and belladonna.

For the practical purposes of the wholesale or pharmaceutical chemist the methods of analysis do not require to be of absolutely theoretical accuracy, a practically accurate method which can be applied with rapidity, and giving constant results, being more satisfactory for everyday use. With the object of elaborating such assay processes I have commenced the study of several of the more important drugs, and the results of my experiments upon conium, so far as I have been able to extend them, I now submit to this Association as a report upon Pharmacology. The experiments are, however, far from complete, as I have not yet had leisure to apply the method of analysis to the preparations of conium, with the exception of a few estimations of the extract which I,

* *Pharm. Journ.*, [3], vol. xvii., p. 741.

* *Pharm. Journ.*, [3], vol. xvii., p. 971.

however, reserve till I have worked out more fully the modified method required. I was led to commence the estimation of the conium alkaloids from a belief that all methods which entail the evaporation of a solution of the free alkaloids must necessarily give results too low, from loss of the volatile coniine. The disadvantages of methods in which distillation is employed are manifest, one great source of error being the liberation of ammonia by the action of the alkali upon the albuminous constituents of the plant. I had thought that if the coniine and other alkaloids could be separated without distillation, in the form of an ethereal solution containing an excess of an acid, this solution would leave upon evaporation a residue of alkaloidal salts without loss of alkaloid. Hydrochloric acid suggested itself as the most likely acid to use, on account of its ready solubility (when dry) in ether or chloroform, and the stability of the hydrochlorate of conine. Dragendorff states, however, "I have pointed out that those processes which involve the evaporation of a solution of chloride of coniine and determination of the alkaloid from the account of chlorine in the residue, are open to objection on the ground that chloride of coniine is easily volatilized ('Plant Analysis,' clxxx., Werthbestimmung, p. 42)." From previous experience I had reason to doubt this statement, while the following experiments prove that it is not correct when applied to ethereal or chloroformic solutions of the hydrochlorate, whatever may occur in aqueous solutions.

(1) 0·169 gram hydrochlorate of coniine, prepared from the alkaloid, was dissolved in chloroform containing a little HCl, and evaporated spontaneously, and dried at a temperature of 85° C., the residue weighed ·1696 gram, and required 10·5 c.c. of $\frac{N}{10}$ nitrate of silver to precipitate the chlorine, equivalent to 0·171 gram of hydrochlorate of coniine.

(2) 0·112 gram of hydrochlorate of coniine, dried at 100° C., required 6·75 c.c. of nitrate of silver solution, equivalent to 0·109 gram of hydrochlorate.

(3) 0·1676 gram of pure hydrobromate of coniine was dissolved in water, introduced into a separator, chloroform and a slight excess of soda added and shaken well. The chloroformic solution was separated, the end of the separator passing below the surface of an ethereal solution of anhydrous hydrochloric acid gas contained in a tared dish; the washing with chloroform was repeated twice, and the solution of acid hydrochlorate of coniine allowed to evaporate in a current of air; when the liquid was evaporated, the residue was dried at 90° C. It weighed 0·1314 gram = 0·1672 gram hydrobromate, and required 8·05 c.c. of $\frac{N}{10}$ nitrate of silver = 0·1316 gram hydrochlorate, or 0·1674 gram hydrobromate. During the drying at 90° C. it only lost ·0001 gram in the last three hours.

(4) Another sample of coniine hydrobromate weighing 0·0543 gram required 2·65 c.c. of $\frac{N}{10}$ nitrate of silver = 0·0551 gram hydrobromate.

(5) 0·0830 gram of a third sample required 14·15 c.c. of nitrate of silver solution of such a strength that 1 c.c. = 0·001 gram of Cl, which indicated 0·0829 gram hydrobromate. This change in strength of the nitrate of silver solution was made as being much more accurate for small quantities.

(6) 0·1215 gram of the second sample of hydrobromate was treated as in experiment 3, using water acidulated with acetic acid for the solvent, and washing this solution with chloroform, then rendering alkaline with soda and proceeding as before. The hydrochlorate of coniine obtained by evaporation of the chloroform was dried in a desiccator during one night and weighed 0·100 gram; it was then heated on a water-bath for one hour when it weighed 0·096, then again for three hours after which it still weighed 0·096 gram. It then required 20·7 c.c. of the weak $AgNO_3$ solution, equivalent to 0·0953 gram of hydrochlorate or 0·121 gram hydrobromate of coniine.

The washings were all tested and found free from coniine.

In addition to showing the non-volatility of hydrochlorate of coniine these experiments prove that coniine may be separated from its solutions by the ordinary shaking-out method without loss, and that nitrate of silver estimates the alkaloid accurately by the volumetric process, using chromate as an indicator. I then turned my attention to the estimation of the alkaloids in conium fruit, this being the richest part of the plant in alkaloids. At first I used the fruits in No. 40 powder, on account of the difficulty of grinding the fruits fine, but it was found impracticable to exhaust the powder perfectly. Several experiments were conducted which, although unsuccessful, may be worth relating.

(1) Ten grams of the fruits were treated in a Dunstan and Short's extraction apparatus with a mixture of chloroform 50 c.c., glacial acetic acid 1 c.c. The acid was used to prevent decomposition or possible loss by volatilization. After treatment for three hours and a half the marc was found to be far from exhausted. The tests applied to ascertain freedom from alkaloids were—

(*a*) Moisten some of the marc (after driving off chloroform) with soda solution and gently warm. Odour of coniine if not exhausted.

(*b*) Make a thin paste with the marc and water acidulated with H_2SO_4. Filter and test the liquid with Mayer's reagent and also with iodine in iodide of potassium solution. The former gives a whitish, the latter a brown precipitate in presence of coniine.

(2) The same as No. 1., using a mixture of equal parts of chloroform and absolute alcohol in place of chloroform; the extraction was much more complete although not perfect. The solution treated as described below yielded 0·112 gram of hydrochlorate of alkaloids = 1·12 per cent.

(3) Ten grams were treated with alcohol as described by Dr. Squibb for belladonna, but in this case only 0·092 gram was obtained; the loss is probably due to the action of the sulphuric acid during evaporation, as the extraction was quite as complete as in No. 2.

(4) Five grams were treated with 100 c.c. of 2·5 per cent. sulphuric acid, gently warmed for about six hours, allowed to stand one night and filtered. 50 c.c. of the filtrate was treated by the shaking-out method, and left 0·0295 gram of hydrochlorates = 1·18 per cent.; this residue upon titration with nitrate of silver required 5·9 c.c. = 1·08 per cent. calculated as *coniine* hydrochlorate. This method extracts the alkaloids well, but the shaking out is very tedious.

Having now reduced the fruits to a No. 80 powder, as being more suitable for extraction—

(5) Ten grams were treated in an extraction apparatus with a mixture of alcohol 25 c.c., chloroform 15 c.c., and solution of HCl in chloroform (about 5 per cent.) 10 c.c. for about four hours. In this case the extraction was practically complete, the soda test giving scarcely any odour of coniine when applied to the marc. The amount of coniine hydrochlorate obtained, which, however, in this case from some unknown cause was not quite pure, was 0·1245 gram, which by titration gave 0·116 gram = 1·16 per cent.

(6) Five grams treated as in No. 5, but for two hours only, also gave indications of practically complete extraction. The amount obtained was 0·055 gram = 1·10 or by titration 1·08 per cent. calculated as coniine hydrochlorate.

I have very little doubt that this method will be found to give good results, though it requires still further working out, as the difference in these last two experiments is too high; but I intend making more assays of dried fruit and leaves by the same method, which I hope to bring forward as a further note. Meanwhile, I propose this method as being more satisfactory than any yet in use. The details of the assay are as follows:—Five grams of the finely powdered fruits are introduced into an extraction apparatus, a mixture of alcohol 25 c.c., chloroform

15 c.c., and "hydrochloric chloroform" 10 c.c., allowed to percolate through the powder; heat is then applied in the usual way, the liquid being allowed to collect above the marc, and to percolate through into the flask six times. When cold the solution is agitated with 25 c.c. of faintly acidulated water, the watery liquid separated, and the dark coloured chloroformic layer again washed with 25 c.c. acidulated water. These acid solutions are in turn washed with chloroform, then made alkaline with soda, and washed three times with chloroform. The chloroform is run off into a second separator containing alkaline water (the nozzle dipping below this water) to be washed, thence into a tared dish containing an ethereal solution of hydrochloric acid gas, keeping the nozzle of the separator beneath the surface of the ether. This ether chloroform solution is evaporated in a current of air, and the residue dried at a temperature not exceeding 90° C. The dish and contents are then weighed and the coniine hydrochlorate titrated in the usual way with nitrate of silver solution. The alkaloidal residue should be nearly white, and consist of feathery crystals.

All the stages of this process have been checked. All wash waters, etc., tested for coniine and found free from it.

As a final test 0·2015 gram of coniine hydrobromate was heated with the same acid mixture for fully three hours, and carried through the process exactly as described; it yielded 0·1560 gram of hydrochlorate, equal to 0·1984 gram of hydrobromate, or 98·46 per cent. of the amount taken.

I hope shortly to have completed this section of the investigation, and to proceed to the examination of the preparations.

I desire to thank Messrs. Southall Bros. and Barclay for permitting the greater number of these experiments to be carried on in their laboratory, and this Association for the grant of £1 towards the expenses of the research.

A discussion followed, in which the Chairman, Secretary, Messrs. Braithwaite and Bird joined.

The meeting then adjourned.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act.

Bremridge *v.* Gray and Others.

The case of Richard Bremridge, 17 Bloomsbury Square, London, W.C., Registrar under the Pharmacy Acts 1852 and 1868, with the concurrence of Robert Laidlaw Stuart, Procurator-Fiscal of Midlothian, *versus* Andrew W. Gray, Andrew Gray, William Taylor, Jane Maria Gray, David Ovens, James Fettes and Marjory F. J. Fettes, was heard before Sheriff Rutherfurd at the Sheriff Court House, George IV. Bridge, Edinburgh, on Monday, June 27.

Mr. Shaw, Advocate (instructed by Mr. Peter Morison, S.S.C.), appeared for the Complainer.

Mr. Orr, Advocate (instructed by Messrs. Wishart and McNaughton, W.S.) appeared for the Respondents.

Mr. Orr: Before your Lordship proceeds to hear the evidence, there is a question as to the relevancy of the complaint which I desire to raise. Your Lordship will probably dispose of that question first.

Sheriff Rutherfurd: Should not that have been raised before?

Mr. Orr: The case has not been here in any manner before your Lordship previous to this.

Mr. Morison: It was continued owing to the illness of a witness.

Sheriff Rutherfurd: The parties have not been asked to plead yet.

Mr. Orr: I do not know whether it be necessary to ask the Respondents whether they plead guilty.

Sheriff Rutherfurd: You had better state your objection.

Mr. Orr: Your Lordship will see that there are five charges made against the different respondents. The first charge, and probably the most important one, is brought against the seven persons who are stated to be the sole partners or shareholders of a limited liability company carrying on business under the name or title of the Leith Depôt, Limited. The charge is that Andrew W. Gray, Andrew Gray, William Taylor, Jane Maria Gray, David Ovens, James Fettes, and Marjory F. J. Fettes—five gentlemen and two ladies—have been guilty of an offence within the meaning of the 1st and 15th sections of the Pharmacy Act, 1868, in so far as during the period between the 1st of December, 1886, and the 17th of May, 1887, they did together or separately unlawfully and in contravention of the 1st and 15th sections of the Act, take, use or exhibit the name or title of chemist and druggist, or chemist or druggist; that is the substance of the charge. And then in the minor, it is set forth that these seven persons did all and each, or one or more of them, put up, use or exhibit, or cause or procure to be put up, used or exhibited the name or title of chemists and druggists above or in connection with the shop, 49, Leith Walk, Leith, occupied by them, or by the Leith Depôt, Limited, of which they are the sole partners or shareholders, and also in connection with another shop at No. 33, Ferry Road, Leith, occupied by them or by the Leith Depôt, Limited, of which they are the sole partners or shareholders. The next part of the indictment is that they did issue to the public, or cause or procure to be issued to the public printed circulars, labels and advertisements having the words "chemists and druggists" printed or written thereon.

Sheriff Rutherfurd: None of the parties being a duly registered pharmaceutical chemist, or a chemist and druggist within the meaning of the Act.

Mr. Orr: Yes. Under the sections of the Act there is a distinction between a duly registered pharmaceutical chemist and a chemist and druggist within the meaning of the Act. The parties here do not pretend to be pharmaceutical chemists and do not so call themselves. Now the infringement of the Act here is said to consist of taking, using, or exhibiting the name of chemist and druggist, by the Leith Depôt, Limited. The first charge amounts to this that those seven persons, the sole partners or shareholders of this limited liability company, carried on the business of chemists and druggists, held themselves out as chemists and druggists, *quâ* shareholders of this company. It is alleged that those seven persons forming this limited liability company called themselves chemists and druggists; in other words, that this company called themselves chemists and druggists.

Sheriff Rutherfurd: It is not that Andrew Gray called himself a chemist and druggist, or that William Taylor called himself a chemist and druggist, but they being partners or shareholders of the company, added the words "chemist and druggist" after the name, Leith Depôt, Limited.

Mr. Orr: Yes. There is the fact of there being the one sign, bearing the words Leith Depôt, Limited, chemists and druggists. So it is really a prosecution of this limited liability company for calling themselves chemists and druggists. Suppose that there were a hundred or a thousand shareholders here instead of seven, I do not know that my friend would have gone to the trouble of setting out the whole number, but if so, it would only make my position clearer. So that, unless it be the law that a limited liability company cannot use the title chemists and druggists, I submit there is no good charge here. The charge is not that these seven people called each of themselves a chemist and druggist. Now, your lordship will notice this further, that it is not set forth that this limited liability company did not employ a qualified chemist to do the actual work of

dispensing and compounding. The sole question comes to be—and it is a question of law—is it a good charge to make against a limited liability company that they call themselves chemists and druggists? and are they individually contravening the 1st and 15th sections of the Act?

Sheriff Rutherfurd: Or rather, is it a good charge to make against the partners of a limited liability company that they have added the words "chemists and druggists" to the name of the company?

Mr. Orr: I am quite willing so to take it. It is quite clear that if a conviction were to follow, the result would be that you would stop this limited liability company from calling themselves chemists and druggists, because that is really the point wherein the substance of this charge lies. We are not here in a case of five gentlemen and two ladies, each by himself or herself carrying on business and calling himself or herself a chemist or druggist. It is the shareholders putting after the name of the company the words "chemists and druggists," and the question is—are they entitled to do so?

Sheriff Rutherfurd: That would quite well be, according to the assumption of this complaint, if one of them was a duly registered pharmaceutical chemist or a chemist and druggist within the meaning of the Act.

Mr. Shaw: That is the point.

Mr. Orr: I am going to maintain that it is not a good charge; that the law does not require any one shareholder of a limited liability company carrying on business as chemists and druggists to be himself a qualified chemist or druggist, but that the law requires that if a number of persons associate themselves together and agree to float a limited liability company, not one of the shareholders being qualified, they are entitled to do that, provided they employ in their shop a qualified chemist to do the dispensing and compounding. I refer your Lordship to the leading case where this matter has been considered, and which was decided by the House of Lords seven years ago; it is the case of the Pharmaceutical Society *v.* The London and Provincial Supply Association, Law Reports 5, Appeal Cases, p. 857. That was a case very like the present.

Sheriff Rutherfurd: I am familiar with the case, it was cited in a former case.

Mr. Orr: It was a case where a small number of people associated themselves together, and the whole shareholders, except one, were unqualified. They were not chemists or druggists at all, except that one, who had a nominal holding, carried on business behind the counter in dispensing and selling; he was a shareholder to a nominal extent. The Court there held, as your lordship knows, that the 1st and 15th sections of the statute did not in the circumstances apply so as to make this incorporated company liable to the penalty. The actual seller must be a qualified person, no doubt, and in that case you had one of the shareholders qualified; but I am going to point out to your Lordship that the principle affirmed by the decision in that case did not at all depend on that. It was quite general, and was to the effect that in the case of a number of persons associating themselves together to carry on business as chemists and druggists not one of them need be a qualified chemist himself, that that was not in the view of the Legislature in the passing of the Act. What the Legislature intended, and what the public interest demands, is that the person employed by the limited company to dispense and compound and sell to the public shall be a duly qualified chemist; and if they put such a man into their shop it does not matter that none of the shareholders are qualified. You cannot interfere with the liberty of trade to the effect of preventing Her Majesty's subjects combining together in the form of a limited liability company to carry on such a business, any more than in the case of any other business, provided the servant they employ to do the work is himself a qualified man.

Sheriff Rutherfurd: I think in the case cited the decision was that a company was not a person within the meaning of the 15th section.

Mr. Orr: Quite so.

Sheriff Rutherfurd: Because it was there held that the word "person" was used in the statute in the restricted sense of a person who could qualify, and who could pass an examination, and as a company could not do that, they held that the company was not struck at by the 15th section.

Mr. Orr: In regard to the case cited, I would refer your Lordship to the opinions of Lord Selborne, Lord Blackburn and Lord Watson.

Sheriff Rutherfurd: What you maintain is that the Leith Depôt, Limited, could not become chemists and druggists in the manner prescribed by the Act.

Mr. Orr: Yes.

Sheriff Rutherfurd: Is there an examination to pass?

Mr. Morison: There is an apprenticeship to serve, and examination to pass.

Sheriff Rutherfurd: If I recollect rightly, in the case that I had last before me under the Act, the party who had no qualification himself employed a person who had a qualification.

Mr. Morison: It was the case of a partnership, where one of the partners was qualified, but the other was unqualified, and the unqualified person sold in the shop.

Sheriff Rutherfurd: That was clearly an offence under the statute, and the case cited did not touch the point involved there; it was expressly excepted by Lord Selborne.

Mr. Orr: Your Lordship will see from the opinions in the case cited, that a corporation is outside the Act, and is entitled to carry on business, although not one shareholder of the company be qualified, provided they put a duly qualified person in their shop for the purpose of dispensing, compounding or selling. That is what the public interest demands.

Sheriff Rutherfurd: It is quite clear that, in accordance with Lord Selborne's opinion, this complant could not have been raised against the company, but then the prosecutor attempts to get out of that difficulty by bringing it against the individual shareholders.

Mr. Orr: It is simply to get round the difficulty that has been created.

Sheriff Rutherfurd: You contend that if a company may do a thing, it is lawful for individual shareholders, acting for the company, to do the same.

Mr. Orr: Certainly; the company acts by the shareholders. The shareholders, acting *quâ* shareholders, are the company, and if the whole shareholders were convicted, what would be the result? The result would be to stop the company from carrying on business. I think it is plain enough that if my friend had said: "You, the Leith Depôt, Limited, exhibited the title chemists and druggists, and therefore you are liable in a penalty of £5," that would have been bad, according to this decision.

Sheriff Rutherfurd: I must assume that; but then he says that you, A, B, C, and so on, being shareholders of the Leith Depot, Limited, did that.

Mr. Orr: I maintain that it is one and the same thing. I would ask your Lordship to consider for a moment what would be the effect of a conviction: it would be to stop the company from carrying on its business; because these seven people are not here as individuals; they are here as shareholders or sole partners of the Leith Depôt, Limited, with a sign put up over the shop. It is not suggested that the shop is held by seven people individually, with seven signs over the shop and the words chemist and druggist used seven times. It is said that they put up one sign, with the name or title of chemists and druggists; that is the one title that occurs above the door. An attempt is made to get over the difficulty by proceeding against the shareholders, as if they were different from the company. Lord Blackburn refers to that subject very distinctly at p. 871. So that

with regard to a corporation sued in its corporate name, your Lordship could have no difficulty whatever; and the only ostensible difference or difficulty which arises in this case is raised by my friend suing the individual shareholders by name; but the moment we get that length, the case is assimilated to the case here cited. I take it that this complaint is a bad one.

Sheriff Rutherfurd: You mean that these charges are irrelevant?

Mr. Orr: Yes. That applies to the title chemists and druggists above the door, and to the issuing of printed circulars, labels and advertisements with the words chemists or druggists printed or written upon them.

Sheriff Rutherfurd: The two first charges.

Mr. Orr.: Yes. I call your Lordship's attention to this, that although there are seven people, what is charged here is using the one name chemists and druggists, and that makes it quite clear that it is the action of the corporate company that is being struck at.

Sheriff Rutherfurd: The penalty under the 15th section is £5, and if the company had been prosecuted only one £5 could have been obtained; but by prosecuting the shareholders, they ask for a penalty of seven times £5, or £5 for each shareholder or partner.

Mr. Orr: That only helps to bring out more clearly the incompetency of the present proceedings. I have also objections to state to the charges on p. 3 of the complaint. I don't know whether your Lordship desires me to state them just now.

Sheriff Rutherfurd: You had better state all your objections.

Mr. Orr: The next charge is that "the said Andrew W. Gray, not being a duly registered pharmaceutical chemist, or a chemist and druggist within the meaning of the said recited Act, did on or about November 1, 1886, or one or other of the days of September, October or November, 1886, within the office of the Registrar of Joint Stock Companies, Parliament Square, Edinburgh, in the County of Midlothian, or in some place or places in said city and county, the particular place or places being to the complainers unknown, unlawfully, and in contravention of the said 1st and 15th sections of the said recited Act, take, use, or exhibit the name or title of chemist and druggist, by adding said name or title to his subscription to the Memorandum of Association of the Leith Depôt, Limited, which Memorandum of Association is dated the 1st, and registered in the Register of Joint Stock Companies at Edinburgh, the 6th, both days of November, 1886, whereby the said Andrew W. Gray became liable in a penalty of £5 sterling. The next charge is against the said David Ovens, not being a duly registered pharmaceutical chemist, or a chemist and druggist within the meaning of the said recited Act, did on or about the 1st day of November, 1886, or on one or other of the days of October, November, or December, 1886, within the office of the Registrar of Joint Stock Companies, Parliament Square, Edinburgh, in the county of Midlothian, or in some other place or places in said city and county, the particular place or places being to the complainer unknown, unlawfully and in contravention of the said 1st and 15th sections of the said recited Act, take, use and exhibit the name or title of chemist, by adding said name to his subscription to the Memorandum of Association of the Leith Depôt, limited, which Memorandum of Association is dated the 1st, and registered in the Register of Joint Stock Companies at Edinburgh the 6th, both days of November, 1886, whereby the said David Ovens became liable in a penalty of £5. I have two objections to these charges, taking them as one. The first objection is that using the name as here set out by adding it to the subscription to the Memorandum of Association is not "using or exhibiting" within the meaning of the 15th section of the Act. The 15th section provides that from a certain date any person who shall sell or keep open shop for retailing, dispensing or compounding poisons, or who shall take, use or exhibit the name or title of chemist and druggist, shall incur a penalty. There are three cases of offence, the actual selling, then the keeping open shop, and by so doing inviting the public to enter, and the third is——

Sheriff Rutherfurd: It should be any person who sells poisons, or any person who keeps open shop for retailing or compounding poisons, or who shall take, use, or exhibit the title of chemist and druggist.

Mr. Orr: Now, what I maintain is that you must read the third offence, exhibiting or using the name of chemist and druggist, along with the other two, and the meaning plainly is this, that it must be using or exhibiting the name, just as it is in the case of keeping open shop, in such a way as to invite the public to deal with the person. There is exhibiting in a question with the public for the purpose of trading—holding yourself out to the public as a person ready and qualified to deal with them for the purposes of trade; that is the fair meaning of "using or exhibiting," and it must be using or exhibiting in that way. The specific charge here is signing the Memorandum of Association in the Registrar's office, and putting after the signatures, the name chemist and druggist or chemist. In theory the Memorandum of Association is a public document, but it is a document kept by the Registrar of Joint Stock Companies, and laid up on the shelves of his office. I think it would be a straining of the words of this section to say that that is a using and exhibiting of the title.

Sheriff Rutherfurd: There is no publication.

Mr. Orr: Can it be contended that any person is induced to deal with the party so adding the title chemist and druggist to his name? This is a document lying on the shelf in the Registrar's office, and not one in a thousand ever sees or hears about it. Your lordship sees quite plainly, reading this Act from beginning to end, that what the legislature means to strike at and prevent is unqualified persons holding themselves out to the public as qualified to sell poisons. As set forth in the preamble, it was a provision for the safety of the public.

Sheriff Rutherfurd: It was not an Act passed in favour of the Pharmaceutical Society, or any other exclusive society: it was for the protection of the public.

Mr. Orr: Yes. If a man assumes such a title, where the public interest is not endangered, he is not within the scope of the Act. Supposing Mr. Gray is witnessing a deed, and he is designed in the testing clause as a chemist and druggist, could it be said that that was an exhibiting of the title in the sense of this Act? Or suppose that Mr. Gray were getting married, and goes to the registrar, and puts himself down as a chemist, and his name is hung outside the registrar's office, could it be said that that was an exhibiting of the title in the sense here meant,—viz., inviting the public to trade with him,—to come and buy from him as a chemist? One can easily see that keeping open shop is a direct invitation to enter. That is the case where there is a sign over the door, even though the shop is shut. But the case of a man signing a private document, and calling himself a chemist was never within the view of the Legislature in passing this Act. With regard to my second objection, your Lordship will have to look at the two Acts together, because I think they form a code which regulates this whole matter. There is the Act of 1852, 15 and 16 Vict., cap. 56, and your Lordship knows that the general purpose of that Act is to set up a system of examinations of persons seeking to be qualified as pharmaceutical chemists, and there is a register appointed to be kept, in which the Registrar is to keep a register of persons duly qualified, and there is a provision in section 12 that persons not qualified are not to call themselves pharmaceutical chemists, or hold themselves out as such, and if they do so, the Registrar is to prosecute, and they are to be fined. Then the present Act was passed to amend that Act, because certain of the provisions of the Act of 1868 deal exclusively with pharmaceutical chemists and druggists in business prior to the passing of the Act; they are to

be eligible as members of the Pharmaceutical Society. Then, in the Act of 1868 you have provisions analogous to those in the Act of 1852; you have a register appointed to be kept of persons, not pharmaceutical chemists, but chemists and druggist under this Act. The same gentleman is the Registrar as under the first Act, and if any person wrongfully assumes the title chemist and druggist, he is to prosecute him in the same way, and the same person is prosecutor. The office is practically the same under both Acts. He is to sue for a penalty, and the penalty is to be recovered in the same way—in short, everything is the same. The intention of the Legislature is to take these two statutes together as forming a code which regulates this matter, with regard to the two classes of chemists. The two sets of prosecutions are to be on the same footing as far as possible. Now, with regard to the period within which an action must be brought I say that that plainly brings the limitation of six months into the second as it is in the first Act. The offence is here stated to have been committed on November 1, 1886, so that we are beyond the six months if my objection is good. The two last charges on p. 4 of the complaint are charges in regard to a sale of poison by a man who is said to be unqualified. David Owens is charged with such an offence, "in so far as not being a duly registered pharmaceutical chemist, or a chemist and druggist within the meaning of the said recited Act, he did unlawfully, and in contravention of the said 1st and 15th sections of the said recited Act, on or about the 15th day of December, 1886, or on one or other of the days of said month and year, within said shop, No. 49, Leith Walk, Leith, and in the county of Midlothian, sell to Alexander Coates, residing at No. 20, James Street, Edinburgh, in the said county a poison, viz., a quantity of laudanum, being a preparation of opium, and a poison within the meaning of the said recited Act, whereby the said David Owens became liable in a penalty of £5 sterling." The next is the case of Robert Fairweather, who is alleged to have sold a quantity of oxalic acid, being a poison, on 18th May, 1887, he not being a qualified person. I do not object to these charges; I think they are relevant. The charge against Fairweather, I understand, has been withdrawn, and another charge has been served upon Mr. Wharton Thomson.

Sheriff Rutherfurd: Is the charge against Fairweather withdrawn?

Mr. Shaw: Yes; there has been a mistake in the name. We have substituted the right name, and have served a new complaint, which I understand will be taken to-day also.

Mr. Orr: I do not object.

Mr. Shaw: It practically substitutes Mr. Wharton Thomson for Mr. Fairweather.

Mr. Shaw: My Lord, as I understand, the objection which is taken to the relevancy of this complaint is that it is truly a complaint against a company, limited and registered under the Companies Acts of 1862 and 1867. Now with reference to the facts in the case as alleged by my friend, my first contention is that I do not complain here as against the company. The complaint is particularly and carefully drawn as against the shareholders of the company, and I am to contend to your Lordship that it is a relevant complaint; and that indeed, if it were not relevant, it would be possible for any number of persons who wished to evade this statute for the protection of the public, to do so, and to conduct the business which is here prohibited, except under special conditions, by simply associating themselves together and calling themselves by a company name. My learned friend is so far right when he says that this is a complaint directed against the operations of the Leith Depôt, Limited; I admit that. But the ground of my objection, representing as I do the official charged with the inspection and supervision of these matters under the statute, is that no one single member or shareholder of the Leith Depôt, Limited, did pass an examination under the statute, or could possibly in his own name and right have started business as a chemist and druggist in Edinburgh. Observe, to begin with, that the title which is used is "chemists and druggists," and is not a title in the singular. To all intents and purposes it represents that the persons composing that company are chemists and druggists. Now, I beg your Lordship to observe that it is not necessary for my argument to maintain that every shareholder of this company must be a person registered under the Act; but I maintain that it is amply sufficient for my argument to say, as I libel here, that no person who is a shareholder of that company is registered. Your Lordship, I think, has already taken notice of the fact that at the bottom of p. 2 of this indictment, after stating the offence in the language of the statute, I further add the words "none of the said Andrew W. Gray, Andrew Gray, William Taylor, Maria Gray, David Ovens, James Fettes, and Marjory F. J. Fettes, being a duly registered pharmaceutical chemist, or a chemist and druggist within the meaning of the said recited Act." My second point, in answer to my learned friend, is that I think there is the following fallacy underlying the argument which he has addresssd to your Lordship. He said that it was evidently the intention of the statute to direct its provisions against a person, and not against a corporation *calling itself* chemists and druggists. Now, just be pleased to look at the language of the statute in that view. I am not here asking a penalty against any person or any company calling itself chemists and druggists. I am here practically under the 3rd subsection of section 15, asking a penalty in respect of a contravention of the statute, to the effect of "taking, using, or exhibiting the name or title of chemist and druggist." Now, the fallacy, which is one of language, is important. A person, for instance, named John Thomson, would not be guilty unless he called himself John Thomson, chemist and druggist. But then, if the language of the statute had provided that only a person is guilty who calls himself a chemist and druggist, it would have been open to John Thomson to start business, and to conduct the operations of that skilled profession by saying, "I am John Thomson, and have no right to call myself chemist and druggist, but the name above my door is David Jones, chemist and druggist."

Sheriff Rutherfurd: Or he might call himself John Thomson and Co.

Mr. Shaw: Yes. That was to be my second point. We are not dealing here with the case of "calling oneself" chemist and druggist, but the case of using or exhibiting the name "chemists and druggists." Just go a little further, and assume that seven persons, not one of whom is able to carry on this business or assume this title, coalesce in the shape of a limited company, then the remarkable fact would follow that having coalesced and registered themselves as a limited company, they are able to evade that which in each individual case they would have been unable to evade. In the present case, to take an illustration, we have two shops conducted under the name of the Leith Depôt, Limited. Suppose we had had seven shops conducted under the name of the Leith Depôt, Limited, and suppose the provisions of the contract of co-partnery, or of the memorandum of association, had been to the effect that David Ovens was to have the profits of the shop in Leith Walk and Marjory Fettes was to have the profits of the shop in Princes Street, and so on, cutting out the profit of each individual seventh part of the operations of the company for each seventh part of the registered shareholders, the result would have been that each one of these individuals would be reaping the profits of a chemist's shop. Individually, they would be unable to carry on business or assume the title of chemist and druggist, and yet by coalescing into the form of a limited company they would be able in the sevenfold character to

evade the provisions of the statute. Then we come back to the argument that this prosecution is directed against a corporation. The importance of that is this, that in the case of the Provincial Supply Association, a decision was given which it would be quite presumptuous for me to attempt to question, and the gist and burden of which is that you are here in an attempt to enfold within the range of the word "person" a corporation. Had the case been a Scotch one, no doubt we might have had less difficulty, because we are more familiar with the idea of a corporation being a *persona* perfectly recognizable in law. If you take two-thirds of the opinion of Lord Selborne, your Lordship will find that his difficulty is entirely this, that a corporation cannot fall within the scope of the word "person," because a corporation cannot go through the course of education which is necessary and cannot pass the examinations which are necessary in order to be qualified to conduct this business. Now, the passage which my learned friend referred to at page 862 amply proves that, because his lordship's judgment, as there recorded, is to the effect that, if a statute provides that no person shall do a particular act except on a particular condition, it is perfectly natural and reasonable, unless there be something in the context or manifest object of the statute or in the nature of the subject matter to exclude that construction. The point, as I have said, lies in the examination of individuals who go through the course of training required under the Pharmacy Acts. Therefore, I bring this complaint, not against a corporation to whom that incapacity or that inability applies, but against the individuals composing the corporation, and I apply the view which Lord Selborne lays down there. Is it impossible for David Ovens to have passed an examination under these statutes? He seems to have thought it an important thing that some member of the corporation should be a registered chemist and druggist, because in signing the memorandum of association—I say this merely for the purpose of illustrating my present argument—in signing the memorandum of association, David Ovens, though not entitled to do so, called himself a chemist and druggist.

Mr Orr: That is a statement which is not according to the fact, and which we shall disprove.

Mr. Shaw: The public must look to this corporation as containing within its borders some one who is entitled to use the name of chemist and druggist. David Ovens used the title chemist and druggist.

Mr. Orr: I do not think my friend is entitled to make such a statement.

Sheriff Rutherfurd: It is possible he may have used the title.

Mr. Orr: Yes.

Mr. Shaw: Therefore I say that here you have a case in which I take hold of the individuals, and I say to them, "It is perfectly true that you, A. B., did not use the name of chemist and druggist as belonging to you, but it is also equally true that you 'took, used or exhibited' the name or title of chemist and druggist."

Sheriff Rutherfurd: I think the House of Lords, in the case cited, held that while a corporation was not a person within the meaning of the 15th section, and would not be guilty of an offence by selling poison, yet any individual member of the corporation who sold, if not duly qualified, might be guilty of such an offence.

Mr. Shaw: There is no doubt about that.

Sheriff Rutherfurd: You say that that is the case here. The corporation may not be guilty of an offence perhaps in calling itself chemist and druggist, or adding after the name of the Leith Depôt, Limited, the words chemists and druggists, but every member of the corporation who does that is guilty of the offence?

Mr. Shaw: Yes.

Sheriff Rutherfurd: It is difficult in this particular matter to dissociate the partners of the corporation from the corporation itself.

Mr. Shaw: Why is it difficult? It is only because it is the clearest and best way that individuals wishing to evade the statute could adopt.

Sheriff Rutherfurd: I see the force of your argument.

Mr. Shaw: I have another observation to make upon the terms of section 15. Now the first part of that section relates to any person who shall sell. Keeping open shop was the offence in the Provincial Company's case, and the force of much of the reasoning in the House of Lords lay in this, that keeping open shop must be held in the closest relation with selling. That reasoning is founded upon the actual language of the statute itself, because the statute goes on in the words "or keep open shop for retailing, dispensing, or compounding poisons." Therefore their Lordships held that if you have a protection in the sale of the poisons themselves, it is impossible to separate keeping open shop from that sale, because the statute itself provides for the case of keeping open shop for retailing, dispensing, or compounding poisons. So that if the protection comes in at the point of sale, it does not matter in whose name the shop be kept.

Sheriff Rutherfurd: In the case of the Provincial Supply Association, while they had qualified persons to compound and dispense the drugs, the action was brought against them on the ground that the sale of the articles was made by a person not duly qualified.

Mr. Shaw: Yes, and then Lord Selborne proceeds to take the illustration of keeping open shop, and to refer to the protection which is afforded to the public if the actual sale is under the supervision of a qualified man. But then the next part of the statute is different; it proceeds upon a different footing. We are not now dealing with the "retailing, dispensing or compounding of poisons," but with those who shall "take, use or exhibit the name or title of chemist or druggist, not being a duly registered chemist," and so on. Now, observe, the first point deals with poisons, speaking generally, keeping an open shop for the sale of poisons. The second part deals with the exhibition, use or taking of the name of chemist and druggist. That provision is in entire analogy with the preamble of the statute, which is to the effect that it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing, or compounding of poisons, and persons known as chemists and druggists should possess a competent practical knowledge. The safety of the public is also involved, because although in certain departments of the business it is not possible for an assistant to poison the public, he may do the public a good deal of damage, by selling one drug for another and causing disturbance in a most delicate dispensing practice.

Sheriff Rutherfurd: Do you maintain that David Ovens, Miss Fettes and so on, are persons who are known as chemists and druggists?

Mr. Shaw: The preamble has the words "known as chemists and druggists." The provision of section 15 is that you are not to make yourself, either in one capacity or another—for that is what it comes to—known as a chemist and druggist, by taking, using, or exhibiting the title. I do not care whether you say that you John Thomson are a chemist, or that John Thomson and Company are chemists, or that John Thomson, Limited, are chemists. Your are thereby making yourselves—the only known shareholders of that company—and you are known, through the company, as being chemists and druggists. You are "taking, using, or exhibiting." All that the statute requires me to establish is that by some means or another you are taking, using or exhibiting the title chemist and druggist, and you are not entitled to do so when in point of fact you have never passed the requisite examinations, etc. In the case of the Provincial Supply Association, there was no conviction because the public were supplied through the fingers of a perfectly competent person. In the present case the offence consists in taking, using, or exhibiting the title chemist and druggist, an offence which they

do not commit by the hand of another, but of which they themselves must be held to be the perpetrators.

Sheriff Rutherfurd: You maintain that it cannot be said they are not doing so.

Mr. Shaw: It cannot be said they are not doing so.

Sheriff Rutherfurd: They call themselves the Leith Depôt, Limited, chemists and druggists.

Mr. Shaw: Yes. I do not know that I have anything further to urge upon the first part of the objection of my learned friend. I think I have distinguished the case of the Provincial Supply Company from the present, and the distinction is two-fold. In the first place, we are here dealing with persons and not with a company. If we are dealing with persons in association, all difficulty on that head is avoided by the fact that not one of these persons is qualified, and that that is libelled. I quite admit that if one member of this company was a registered chemist the case would be entirely different, and perhaps much more difficult; but here I am libelling a case in which seven unqualified persons are simply evading the statute by using the name as applicable to a company of which they are shareholders. I maintain that that is an evasion which cannot be allowed. Then, with regard to the other part of the argument, it is of much less importance. I do not understand my learned friend to have any objection to the offences which are libelled on p. 4 of the complaint, or to that libelled against Wharton Thomson. With regard to the offences libelled on p. 3, my argument is that, while it is quite true that the 1st of November is stated as the actual date when the memorandum of association was signed, it is perfectly clear from the body of the indictment that the Act in question is a continuing Act; the thing goes on till now. I do not wish, however, to press that too far, because it is not of much importance here. The real gist of the complaint is in the previous part of it, but what I submit is that it is made perfectly plain from the body of the complaint that the putting of the name or title upon the Joint Stock Register is in itself an offence which still continues. I should further represent that while the 1868 Act repeats so far the provisions of the Act of 1852 with reference to the appointment of a registrar, it gives no limit in point of time to the period within which the action is to be brought.

Sheriff Rutherfurd: Do you say there would have been more safety to the public if one of these parties had been qualified?

Mr. Shaw: There would then be a person interested in the conduct of that business who had skill in the management of it.

Sheriff Rutherfurd: The public would have no guarantee that he was to take any charge.

Mr. Shaw: No further than in the case of any other registered chemist and druggist. That is the only guarantee of attention to the business, that the man is interested in the success of the business. You have no guarantee in individual cases that the man will attend to the business, nor have you a guarantee in the case of a registered company that the shareholders will do so, any further than this that in the shareholders' case as in the individual case, you have an interest coinciding with a qualification; the interest to conduct the business properly coincides with the skill and qualifications prescribed by the Act.

Mr. Orr: My learned friend's entire objection, so far as I can see, would have been obviated if one of our qualified assistants had one share in the company. In the case which was quoted, there was a qualified man who had a nominal holding, but his real interest was the salary which he drew as manager. My friend seems to draw a distinction between the case of a man who had a merely nominal share, which would probably yield no profit, and the case of a man drawing a salary. That illustrates the shadowy nature of the distinction attempted to be drawn between the two cases. I would refer your Lordship to p. 858 of the volume already quoted.

Sheriff Rutherfurd: It was under the circumstances there set forth that the word "person" was held not to apply to a corporation or company. I think Lord Blackburn went so far as to say it would be a question of great difficulty, supposing a sale was made by an unqualified person for the company, whether the company was not liable.

Mr. Orr: That observation would not have applied to the case in hand, because the actual seller was qualified. The public interest lies in the actual sales being conducted by qualified persons. If you had the case of a company composed of unqualified persons conducting its sales by the hands of unqualified persons, then they might be liable.

Sheriff Rutherfurd: There are some offences which might be committed in the conduct of the business and there are other offences, such as taking or exhibiting the title, which do not necessarily apply to the conduct of the business in the shop.

Mr. Orr: I think it all comes back to this, whether the intention of the Legislature was not just that the person who actually dealt with the public in supplying them with the goods should be qualified. If you get qualified persons to do that, I maintain that there is nothing in the law, as it stands, requiring the shareholders of a limited company to be qualified. In point of fact, since the case was decided in 1880, people have thrown themselves into the form of limited companies; they are quite common, and have been for the last seven years, all over the country—persons trading as limited companies and employing qualified assistants. I am not aware that my friend can point to a single case where any attempt has been made to prosecute these.

Mr. Shaw: This is the only case occurring that we know of.

Mr. Orr: I think there are dozens of them up and down the country, in Scotland and England.

Sheriff Rutherfurd: I see the prosecutor, Mr. Bremridge, is Registrar under the Pharmacy Acts. What you suggest is that he might have found a case nearer home.

Mr. Orr: Yes, because there are many cases in London and all through England.

Mr. Shaw: I do not know that my friend is entitled to say there are any other such companies where none of the shareholders are qualified.

Mr. Orr: My information is that there are several such companies. Lord Selborne points out that prior to these Acts being passed there was nothing in the law to prevent a limited liability company carrying on business as chemists and druggists. The shareholders of such a company may be engaged in every variety of occupation and not one of them may be qualified in a business of this kind, because the public interest does not demand that that should be so. What such a company have to see is that they employ properly qualified persons in dealing with the public. My friend attempted, unsuccessfully to show that the persons here prosecuted are so prosecuted as individuals, and that you are to separate them in their individual capacity from their positions as shareholders. I say that they are not known as chemists and druggists, because not one of them appears before the public in that capacity. The individual shareholders are not holding themselves out or exhibiting themselves as chemists and druggists. It is the Leith Depôt, Limited, who are chemists and druggists. My friend was trying to make something of the company adopting the plural form. I think the company would naturally use the plural and not the singular.

Sheriff Rutherfurd: There is a good deal of force in your argument, but then the difficulty is that you are in one sense taking, using, or exhibiting the name of chemists and druggists.

Mr. Orr: In this sense, that the Leith Depôt, Limited, which they compose, calls itself chemists and druggists. It would be an extraordinary straining of the language of the statute to hold, as it is attempted by this complaint, that each one of these ladies and gentlemen is holding himself or herself out as a chemist and druggist.

Sheriff Rutherfurd: The answer to that is that they are taking or using the name in this particular way, not as regards themselves, but as regards this society or company of which they are shareholders.

Mr. Orr: They use the name as a company, and I say that is precisely what they are entitled to do. When they have a qualified person dealing with the public across the counter, it does not matter that not one of the shareholders is within a hundred or a thousand miles of the place where the business is being carried on. I do not know that I need say anything more with regard to the charges on page 3 of the complaint.

Mr. Shaw: I may just state that there is not known to the Registrar any other company in the United Kingdom in similar circumstances to the present.

Sheriff Rutherfurd: You need not go into that. This objection to the relevancy certainly raises a question of great difficulty and importance. Probably I would not have found it attended with so much difficulty, but for the judgment of the House of Lords in the case cited. I must take time to consider the matter.

The case was adjourned till Thursday.

[*For further information as to the decision of the Sheriff upon the points raised, see p.* 6.]

Poisoning by Strychnine.

The inquiry into the circumstances attending the death of Sarah Ann Parry, who died from having taken a dose of poison on June 10 (see vol. xvii., p. 1066), was concluded on Friday, June 24, at the Duke of York Inn, Beeston Hill.

Mr. Scattergood, surgeon, said he had analysed the contents of some jars he received from Mr. Shirley. He found that the stomach contained 3 ounces of half-digested food and a small quantity of strychnia. He looked carefully through the food and on the surface for any colouring matter, but found none, showing that in all probability the strychnine had not been taken in the form of vermin-killer. The following day he received from the Coroner's officer a bottle labelled "essence of pennyroyal," with the name of R. H. Smith also upon it. The bottle smelt of peppermint or pennyroyal. It contained two or three drops of colourless liquid. He analysed the liquid, and found it was strychnia. He had also received from the Coroner's officer a bottle labelled "essence of pennyroyal," with the name of John Slater upon it. He examined it, and found it, as labelled, pennyroyal. He had no doubt that the woman had died from strychnine poisoning, taken in the form of a solution.

Mr. Slater produced his prescription books.

The Coroner, after examining them, said he found on almost the first page an entry mentioning liquor strychniæ.

Witness explained that that was in a prescription made up some time ago. He himself prepared it with the exception of adding the strychnine. It was sent to Mr. Jefferson, Dewsbury Road, to have that put in. He had never had liquor strychniæ in his shop that he knew of. It was no doubt common for chemists to keep liquor strychniæ in stock, but it was very seldom used.

By Mr. Child: He had always found Clay reliable and trustworthy. Last week witness stated that he had nux vomica in stock; he had since discovered that he had had none for twelve months. Smith's shop was much nearer to Mrs. Parry's house than his shop.

Arthur Clay said he had been with Mr Slater fourteen months. He had been mostly at his Malvern Road shop. Before this occurred he had been at the Beeston Road shop daily for two months. He was studying to pass the Preliminary examination for a certificate as a chemist. The examination was in general knowledge, not in drugs. His knowledge of drugs had been picked up while he had been assistant. He did not know anything about the preparation of liquor strychniæ. He did not know of any being in the shop. On Friday, the 10th, he was in the shop, and a woman came in for pennyroyal. Mrs. Pollard, who was examined last week, was in the shop twenty minutes before the woman who came for the pennyroyal. The latter asked for three pennyworth of the essence of pennyroyal. She handed him a long ounce and a half bottle, clean, and without a label. He measured it in the two-drachm measure because the other two measures were dirty. He put one of their own labels on, and wrapped the bottle in a red bill. She handed him three pennies for it. About three quarters of an hour afterwards he heard that a woman had been poisoned. He went to the house. A woman there told him that he had sold strychnine for pennyroyal. Mr. Slater met them going to the house, and witness told him that he had done nothing of the sort, for he remembered particularly noticing the label on the bottle from which he supplied the woman. On getting back to the shop he looked to see if there was any poison near the pennyroyal, but there was none within a yard. He denied that Mrs. Pollard was just leaving the shop as the woman came in for the pennyroyal.

By Mr. Child: He had been dealing with drugs about two years and two months before coming to Mr. Slater's.

After an address from the Coroner, the Jury returned the following verdict:—"1. We all believe that the deceased went to Mr. Slater's for the pennyroyal. 2. That what she received from Mr. Slater's young man produced death. 3. Owing to the contradiction of Arthur Clay and Mr. Slater the Jury are unable to come to any definite verdict as to misadventure or otherwise, and suggest that the case is a proper one for inquiry by the magistrates as to whether there is evidence for committal."—*Leeds Mercury.*

ANSWERS TO CORRESPONDENTS.

W.—(1) Some cruciferous plant, too fragmentary to name; send an entire plant and, if possible, mature seed. (2) *Sinapis arvensis.* (3) *Capsella Bursa-pastoris.* (4) *Lamium purpureum.* (5) *Anagallis arvensis.*

"*Teddington Lock.*"—*Symphytum officinale.*

J. S.—The first fifteen sections of the Act, restricting the sale by retail and dispensing of poisons to registered persons do not apply to "the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing."

Quæro.—It is not quite clear what you mean to imply by the words "pure liquid."

Lympstone.—(1) *Silene inflata.* (2) *Malva sylvestris.* (3) *Ononis campestris.* (4) *Lotus corniculatus.* (5) *Achillea Millefolium.* (6) *Linaria vulgaris.*

Erratum.—In Mr. Humphrey's letter, in last week's Journal, p. 1067, col. ii., line 5 from bottom, for "examiner" *read* "examinee."

Honesty.—We are only in a position to record the decision of the judge, it is not our business to give the reasons for it.

J. A. Clarke.—We do not remember an article that corresponds exactly to your description; but see a paper by Dr. Squibb on "Fluid Extract of Camellia" (*Pharm. Journ.* [3], xv., 183).

A. Ball.—The term "aconitine" is very indefinitely applied, and beyond what appears in the Pharmacopœia there is nothing authoritative as to what it is intended to signify.

Vulcan.—Any stains due to vaselin would probably be removable by means of soap and water; but stains resulting from associated colouring matter might be more difficult to get rid of.

Communications, Letters, etc., have been received from Messrs. Spencer, Wilkinson, Gibson, Bird, Clarke, Tebbut, Ball, Bird, Humphrey, Quæro, Honesty, Lympstone, Vulcan, Teddington Lock, W.

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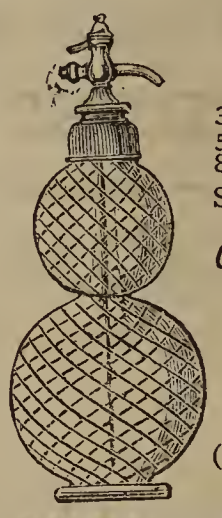

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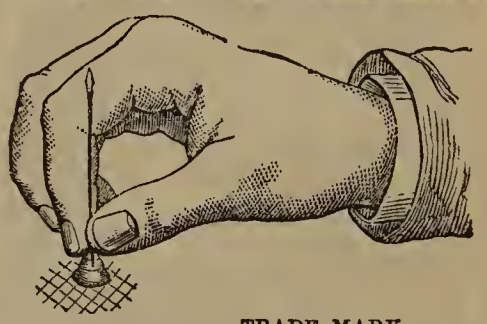

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THE TWENTIETH SESSION, 1887-8,
Will commence on the 15th September.

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„ S. SOUTHAM, Manchester.

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INDIAN MEDICAL SERVICE.

India Office, 17th June, 1887.

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ALLEN JOHNSON, Lieutenant-General,
Military Secretary.

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I will be obliged if you will inform me at above address if I can get it at New York or at St. Louis, the latter being where I live. Favour me with reply immediately, as I leave Glasgow on Friday.

Yours respectfully,
D. MACDONALD.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The

Pharmaceutical Journal

AND

Transactions.

THIRD SERIES, No. 889.] SATURDAY, JULY 9, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

PROFESSORSHIP OF BOTANY.

The Chair of Botany in the above Society's School of Pharmacy will become vacant at the close of the present Session through the resignation of Professor Bentley. The Council invite applications, which should be accompanied by testimonials. The Professor will be expected to lecture from October to July, and will not be required to teach Materia Medica. The stipend is £150 per annum, with the students' fees.

Applications should be sent in by July 24th.

Further information may be obtained on application to

RICHARD BREMRIDGE,
Secretary and Registrar.

COUNCIL EXAMINATION PRIZES.

First Prize.—Pereira Medal in silver, and a present of books value £5, or thereabouts, given by Mr. T. H. Hills.

Second Prize.—The Pharmaceutical Society's Medal in silver, and a present of books value £3, or thereabouts, given by Mr. T. H. Hills.

Third Prize.—The Pharmaceutical Society's Medal in bronze, and a present of books value £2, or thereabouts, given by Mr. T. H. Hills.

The Examination for these prizes will be held in London and Edinburgh on Saturday, the 23rd instant, at 10 a.m.

Pharmaceutical Chemists who have passed the Major Examination during the present Session, and who were Associates of the Society at the time of passing the Examination, are entitled to compete for the Prizes.

Persons intending to compete must give notice of their intention to the Registrar, on or before Monday, the 18th instant, after which no further entries will be received.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

Price 1s., or by Parcel Post 1s. 4½d.

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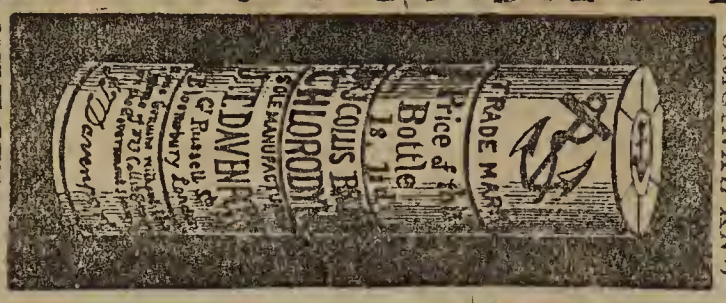

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Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

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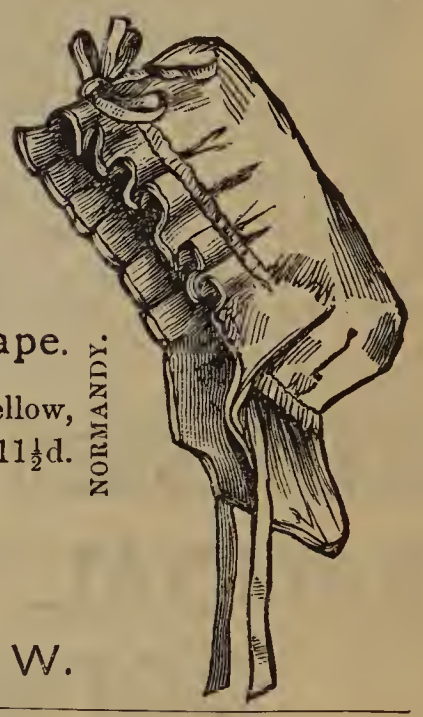

Bathing Caps, Normandy or Brittany cap shape.

Check Sheeting, per doz. 21s., 18s. net; Jaconet, White, Yellow, or Pink, per doz. 21s., 18s. net; Pointille Check, per doz. 28s., 23s. 11½d. net; Sateen Check, per doz. 29s. 6d., 25s. 2½d. net.

J. SANGER & SONS,

489, OXFORD STREET, LONDON, W.

THE SPECIAL ATTENTION OF THE TRADE IS CALLED TO

BENZINE COLLAS

Which is acknowledged on all hands to be the most reliable Preparation for removing Grease, Oil, Tar, Wax or Paint from every description of Wearing Apparel or Household Stuffs. It neither injures the colour or texture, nor leaves any odour or stain. It is neatly got up, and is a most saleable article. Observe the word "COLLAS" on label and cap.

1,000 Handbills, with Name and Address, will be printed for any Chemist who gives an order for £1 WORTH of BENZINE COLLAS at the following prices, viz.:—6d. Size, 4s. per doz., subject to Discount. 1s. Size, 8s. per doz., subject to Discount. 1s. 6d. Size, 13s. 6d. per doz., subject to Discount. SPECIAL QUOTATIONS TO SHIPPERS AND BUYERS OF 6 DOZEN OF ANY SIZE AND UPWARDS.

J. SANGER & SONS, 489, OXFORD STREET, LONDON, W.

KEARSLEY'S Widow Welch's FEMALE PILLS

These are universally acknowledged to be the Genuine, and Druggists may safely recommend them.

CAUTION !

The Proprietors of Kearsley's Original Widow Welch's Female Pills find it incumbent on them to caution the purchasers of these Pills against various imitations by parties who have no knowledge of their peculiar preparation, the Original Recipe having been sold to the late G. Kearsley, of Fleet Street, whose Widow found it necessary to make an affidavit, for the protection of her property, in the year 1798. The Genuine Recipe for **Widow Welch's Female Pills** has been prepared by them for **99 Years!** Chemists are particularly requested to remark that, as a testimony of authenticity, each bill of directions contains an affidavit, and bears the signature of "C. KEARSLEY," in writing, also engraved on the Government Stamp, and each box is wrapped in WHITE paper.

Price 27s. per Dozen, subject to usual Discount.

Special Quotations to Shippers and for large quantities on application to

J. SANGER & SONS, 489, OXFORD STREET, LONDON, W.

The Pharmaceutical Journal.

SATURDAY, JULY 9, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROSECUTION OF THE "LEITH DEPÔT, LIMITED."

THOUGH the report of the further proceeding in this case is so ample as to require the publication of a supplement, it will probably suit the convenience of some of our readers if we give a concise *résumé* of the more important features of it. The chief point of difference between this case and the action against the London and Provincial Supply Association consists in the proceedings being directed against the individuals constituting the Company and carrying on the business of chemists and druggists under the name of the Leith Depôt, Limited. From the evidence given by the witnesses on both sides it will be clearly perceived that the business carried on at both shops belonging to the Company was that of a chemist and druggist in the ordinary sense of the term, and that whatever "wholesale" business may have been carried on there simultaneously, a very considerable proportion of the daily transactions, comprising the sale of penny packets of oxalic acid, pennyworths of laudanum, and the dispensing of prescriptions, was not of such a nature as could be held to come under the exemption provided by the 16th clause of the Pharmacy Act in respect of business done in the ordinary course of wholesale dealing. On the contrary it is evident that the ordinary business of the Leith Depôt, Limited, was, for the most part at least, of the nature to which the provisions in the 1st and 15th clauses of the Pharmacy Act, 1868, are especially intended to apply. On reference to the Register of Joint Stock Companies it appeared that of the seven registered shareholders, ANDREW WILLIAM GRAY held 40 shares, ANDREW GRAY, 120, Mrs. GRAY, 430, and the other four shareholders held ten shares amongst them; so that the business might in all probability be regarded as actually belonging to the first-named shareholder, who was in fact the active manager of it. But, however that might be, from the fact that neither Mr. A. W. GRAY nor any of the persons who were joint shareholders with him in the Company were registered chemists and druggists, their use and exhibition of the title of "chemists and druggists" above the two shops in Leith, and upon labels and circulars, was a contravention of the 1st and 15th sections of the Pharmacy Act and constituted an offence by which Mr. A. W. GRAY and each of the persons associated with him rendered themselves liable to the penalty prescribed by the Act. This was the substance of the first and second charges in the complaint of the prosecution.

The question raised as to a point of law, upon the ground that the proprietors of the two shops in Leith constituted a company, and could not, therefore, be prosecuted individually for a contravention of the Act, any more than the company to which it has been held that the Act does not apply, has been decided by the Sheriff in favour of the prosecution, and he has, in a very clearly stated decision, expressed his opinion that in coming to that conclusion he has only been carrying out to their just and logical conclusion the views expressed by the law Lords on the appeal to the House of Lords in the case of the London and Provincial Supply Association. He holds that the very fact that a company cannot qualify shows conclusively that if the title "chemists and druggists" be adopted in connection with a company and the business carried on by it, that can lawfully be done only when the individual shareholders who are able to qualify actually possess the requisite qualification. This decision, which will be found at page 28, we commend to the careful consideration of our readers, as being of the first importance as an interpretation of the Pharmacy Act. There is a possibility that it will be made the subject of an appeal, but when taken in conjunction with the expressions of opinion on this point of the individual liability of unqualified shareholders in a company by Lord SELBORNE and Lord BLACKBURN, it is scarcely likely to be reversed.

The failure of the argument that from the point of view of public safety the employment of qualified assistants was a sufficient compliance with the provisions of the Pharmacy Act to convince the Sheriff that the defendants in this case had not committed a breach of the Act is also a very important point. Having regard only to what is requisite in the administration of the Act the Sheriff laid more stress upon the consideration that while the public knows nothing of the management of a chemist's business they deal with persons who hold themselves out as such on the faith of their being what they represent themselves to be. The real question to be decided is whether under the statute it is an offence for the proprietors of a business to describe themselves as chemists and druggists when they do not possess the legal qualification of being registered under the Pharmacy Act. The judgment given in the Leith Depôt case most emphatically declares that such a proceeding is an offence rendering the individual shareholders in a company liable to the statutory penalties, and thus a very material step has been gained in the enforcement of the law against associations of the kind which have lately come into operation.

We are requested to draw attention to the announcement which appears among the advertisements that in consequence of the retirement of Professor Bentley the chair of Botany in the Society's School will become vacant at the close of the present session, and that the Council invites applications for the appointment, which are to be accompanied with testimonials, and sent in by the 24th inst.

* * *

The Report of the Committee of experts appointed by the Local Government Board to inquire into the nature and results of the Pasteur method of treating hydrophobia, presented to Parliament a few days since, has relation to a subject of such wide-spread interest, and constitutes from the high scientific standing of the members of the Committee so weighty an expression of opinion as to the value of M. Pasteur's discovery, that it is intended to reproduce it *in extenso* in the next number of this Journal. Meanwhile it may be stated that this Committee, as the result of numerous experiments and inquiries, practically endorses the claims made on behalf of M. Pasteur, and is of opinion that he "has discovered a method of protection from rabies comparable with that which vaccination affords against infection from small-pox." The Committee does not commit itself to any theory as to the nature of this immunity, but M. Pasteur's view may be summarized briefly thus. M. Pasteur believes that the virus of rabies, or hydrophobia, is a living micro-organism (at present, we believe, unidentified), which is specially located in the spinal cord and which produces an excretion capable when present in sufficient proportion of inhibiting the activity of the parent virus just as the activity of yeast is held in abeyance by the presence of alcohol produced in fermentation. Consequently, according to this view the spinal cord of animals that have died of rabies would contain both the virus and the excretion that may be considered to be its antidote, and one problem was how to treat the cord so as to reduce the potency of the virus without diminishing the efficiency of the antidote to an equal extent. This M. Pasteur believes may be effected by drying the cord in a pure and dry atmosphere at a temperature of 20° C., and he finds that an emulsion of a cord so dried may be injected, not only without any risk of producing rabies, but with the result of establishing immunity from the disease, presumably by the introduction of excess of the antidotal secretion. The preventive treatment is commenced by the injection of a preparation from a cord that has been dried during fourteen days, and at first the injection was repeated on ten successive days, the emulsion used on each day differing from that used on the previous one in being prepared from a cord that had been dried during one day less, so that on the tenth day the cord used had only been dried during five days. Subsequently, in order to meet some very severe cases, M. Pasteur adopted what he calls the "*méthode intensive*," in which the injections are intensified in strength and more frequently repeated, so that on the eleventh day the injection used has been prepared from a cord dried during only one day. This change was followed by a diminution of mortality, but as it was thought possible the "intensive" treatment might sometimes involve danger it was further modified to that which is at present followed, in which starting with an injection prepared from a cord dried during fourteen days the treatment is gradually intensified until on the fifteenth and final day an injection prepared from a cord dried during five days is used.

* * *

The latest *Bulletin* issued from the Royal Gardens, Kew, contains some interesting information respecting a proposal for the establishment of a botanical federation for economic purposes between the British West Indian Islands, having for its special object to counteract the depression that has fallen upon them consequent upon the present low price of cane sugar. This price, it is stated, has now reached so low a point, owing to the keen competition of beet sugar, and to fiscal regulations affecting its production, that the chief industry of the West Indies for the last hundred years is carried out under circumstances of extreme difficulty, although it is believed by some that, if improvements in cultivation were adopted and similar scientific skill were utilized in the production of cane sugar as is applied in the manufacture of beet sugar, the cane sugar industry could still be carried on in the West Indies remuneratively. In some of the islands, however, progress has been made in developing the cultivation of other economic products. Last year the chief export from the island of Jamaica was fresh fruit, which was sent to the United States. In Trinidad cacao is largely grown, and it is suggested that coffee, spices, fibres and fruit might be added. Granada is fairly prosperous owing to the gradual supersession of sugar cultivation by that of cacao and spices. Some time since the subject was taken up by Sir Joseph Hooker and Mr. Thiselton Dyer, and three years ago a report from Mr. D. Morris, now Assistant Director of the Royal Gardens, Kew, in favour of the formation of a small botanical establishment in each island, to be affiliated with that already in existence in Jamaica, received endorsement by the Earl of Derby, then at the Colonial Office, who strongly recommended the proposition to the consideration of the Governors of Barbados, Leeward Islands, Bahamas, and British Honduras, with a suggestion that an annual contribution of £20 should be forthcoming from each to provide for the extra expense that the scheme would entail upon Jamaica. The proposition was received favourably by several of the colonies and presidencies named, and already some steps have been taken towards its realization.

* * *

A prospectus has been issued by the Committee of the Edinburgh Chemists' Assistants and Apprentices' Association describing the conditions under which the "Association" and "Ainslie" prizes for the session 1887–1888 will be competed for. The "Association Prizes" are three in number, ranging from £2 2*s.* to 7*s.* 6*d.* in value, for the successful competitors in an examination including the subjects of Latin, English, arithmetic, elementary chemistry and pharmacy. The nature of the "Ainslie Pharmacy Prize" is sufficiently indicated by its title; it is of the value of £1 1*s.*, and is supplemented by a special book prize of the value of 10*s.* 6*d.* Further particulars may be obtained from the Secretary to the Association, Mr. A. W. King, 119, George Street, Edinburgh.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 6, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Cross, Evans, Greenish, Hampson, Hills, Newsholme, Radley, Richardson, Robbins, Savage, Schacht, Symes and Woolley.

The minutes of the last meeting were read and confirmed.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society:—

Andrews, Edward Arthur.
Clubb, William Herbert.
Gibbs, Sydney.
Lang, John West.
Sansom, Frederick James.
Webber, James Wilkey.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Andrews, Edward Arthur .....London.
Gibbs, Sydney .....Eastbourne.
Oram, Frank.....Cheltenham.
Wyatt, Harold.....Bootle-cum-Linacre.

Chemist and Druggist.

John Guy, of Chester, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Clarke, Walter.....Croydon.
Wilks, Robert .....Skipton.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Bishop, George Henry.....Southampton.
Broad, Henry Reynolds .....Kidderminster.
Clark, James.....Buxburn.
Cross, Arthur Richard.....Shrewsbury.
Driffield, Robert .....Spilsby.
Escritt, Harold Teal .....Driffield.
Foot, Wm. Rolstone WhitewayTotnes.
Gould, William Emanuel .....Twickenham.
Gray, William Edwin.....Pickering.
Langford, Frederick Charles ...London.
Loveluck, Griffith David.....Taibach.
Marsh, William Henry .....Old Catton.
Mitchell, John Albert.....Bradford.
Thomas, Lewis.....Bristol.
Vause, John Edward .....Swansea.
Walder, Frank.....Arundel.
Walklett, George James.....Oxford.
Westmoreland, William Henry.Salisbury.
White, Thomas Henry .....Whitby.
Woodward, Moses Mellor .....Nottingham.
Young, Edward Francis.....Portishead.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Barrett, Allan Lifton .....Hay.
Conley, Thomas .....Edinburgh.
Cooper, Charles ....Southampton.
Davison, James Richardson ...Alnwick.
Glendinning, Robert .....London.
Guy, Frederic Jno. Vavasour ...Uppingham.
Hutchison, William .....Dunbar.
Le Seelleur, George ....Jersey.
Mead, Frederick James .....London.
Welch, Geo. Richd. Julians ...Bradford-on-Avon.

Several persons were restored to their former status in the Society upon payment respectively of the current year's subscription and a fine.

Appointment of Professors.

Professor Attfield was appointed Professor of Practical Chemistry for the ensuing year.

Professor Dunstan was appointed Professor of Chemistry for the ensuing year.

Professor Redwood was appointed Emeritus-Professor of Chemistry and Pharmacy for the ensuing year.

Local Secretaries.

The following list, prepared by the Library, Museum, Laboratory and House Committee, was unanimously adopted as the list of Local Secretaries for the ensuing year:—

List of Local Secretaries, 1887–1888.*

Towns eligible.	Names of persons appointed.
Aberdeen	Strachan, Alexander.
Abergavenny	Price, Charles W.
Aberystwith	Wynne, Edwin Price.
Abingdon	Smith, William.
Accrington	Stanley, Thomas.
Altrincham	Clarke, James Thomas.
Andover	Bienvenu, John.
Appleby	
Arbroath	Burn, David Haitly.
Ashbourne	Osborne, James.
Ashby de la Zouch	Bullen, George Wm.
Ashford	Ingall, Joseph.
Ashton-under-Lyne	Fisher, Edwin.
Aylesbury	Turner, John.
Ayr	
Banbury	Ball, George Vincent.
Banff	Alexander, William.
Bangor	Jones, Owen.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Basingstoke	
Bath	Merrikin, John B.
Bedford	Taylor, James B.
Belper	Burkinshaw, W. T.
Berwick	Carr, Walter Paterson.
Beverley	Hobson, Charles.
Biggleswade	Evans, John.
Bilston	Gray, Charles.
Birkenhead	Dutton, Hugh O.
Birmingham	Southall, Alfred.
Bishop Auckland	Thorburn, Hy. Wm.
Blackburn	Garland, Alfred P.
Blackpool	Parkinson, Charles.
Bodmin	Williams, Joel Drew.

* Local Secretaries are appointed in all towns in Great Britain (except London and Edinburgh) which return a Member or Members to Parliament, and in such other towns as contain not less than three Members of the Society or Associates in Business.

Towns eligible.	Names of persons appointed.
Bolton	Mason, William B.
Boston	Haller, Frederick Wm.
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	Rogerson, H. G.
Bridgnorth	Deighton, Thomas Milner.
Bridgwater	Basker, John Anthony.
Bridlington	Jackson, Henry John.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Burton-on-Trent	Wright, George.
Bury	Bowker, Ellis.
Bury St. Edmunds	Summers, Frank.
Buxton	Wright, Robert.
Camborne	Fiddick, Thomas.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Lloyd, William.
Chatham	Crofts, Holmes C.
Chelmsford	Baker, Garrad.
Cheltenham	Barron, William.
Chertsey	Boyce, George.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Chorley	Hill, William.
Christchurch	Green, John.
Cockermouth	Bowerbank, Joseph.
Colchester	Cordley, William Bains.
Congleton	Goode, Charles.
Coventry	Hinds, James.
Crewe	Harrop, Wm. H.
Croydon	Barritt, George.
Darlington	Robinson, James.
Dartford	Wilson, Richard E.
Deal	Green, John.
Denbigh	
Derby	Cope, John A.
Devizes	Edwards, Thos. Roberts
Devonport	Codd, Francis.
Dewsbury	Gloyne, Charles G.
Diss	Gostling, Thomas Preston.
Doncaster	Howorth, James.
Dorking	Clift, Joseph.
Douglas	Brearey, Arthur William.
Dover	Bottle, Alexander.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Ealing	Curtis, F. G.
Eastbourne	Crook, Herbert.
East Grinstead	Tully, John.
Eccles	
Egremont (Cumberland)	Ireland, Edward J.
Elgin	Robertson, William.
Ely	Grimditch, W. J.
Epping	Rowland, Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Broom, William W.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Lenfestey, William G.
Flint	Jones, Owen William.
Folkestone	Goodliffe, George.
Forfar	Ranken, John.
Gainsborough	Spouncer, Henry Thomas.
Gateshead	
Glasgow	Kinninmont, Alexander.
Gloucester	Ward, Joseph.
Gosport	
Grantham	Whysall, William.
Gravesend	Clarke, R. Feaver.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, junior.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Eardley, James F.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Neve, Francis C.
Hawick	Maben, Thomas.
Helensburgh	Harvie, George.
Henley-on-Thames	
Hereford	Williams, Walter.
Hertford	Durrant, George R.
Hexham	Gibson, John Pattison.
Heywood	Beckett, William.
Hitchin	Ransom, William.
Honiton	Dyer, Edward H.
Horncastle	Kemp, Herbert W.
Houghton-le-Spring	Rowell, R. H.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen.
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Inverness	Galloway, George Ross.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John.
Keighley	Robinson, Whiteley.
Kendal	Severs, Joseph.
Kettering	Thursfield, John F.
Kidderminster	Spurway, Edgar.
Kilmarnock	Borland, John.
King's Lynn	Count, Sydney.
Kingston on-Thames	Walmsley, Samuel.
Kingswinford	
Kirkcaldy	Storrar, David.
Knutsford	Silvester, Henry T.
Lancaster	Vince, James.
Launceston	White, Thomas.
Leamington	Pullin, W. H.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leigh (Lancs.)	Bennett, John W.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Sandiland, R. B.
Lewes	Saxby, Henry.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liverpool	Symes, Charles.
Llandudno	Brookes, George.
Llanelly	Evans, Gwilym.
Longton	Prince, A. G.
Loughborough	Foulds, Astley Cooper.
Louth	Hurst, John.
Lowestoft	Sale, Thomas J.
Ludlow	Woodhouse, George.
Luton	Duberley, George S.
Macclesfield	Bates, William Isaac.
Maidenhead	Walton, Ralph.
Maidstone	Stonham, W. B.
Maldon	Wallworth, David.
Malton	Buckle, James.
Malvern	Coldwell, David B.
Manchester, etc.	Wilkinson, William.

Towns eligible.	Names of persons appointed.
Mansfield	Patterson, Douglas J.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Market Harborough	Bragg, William B.
Melton Mowbray	Wing, Geo. N.
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Montrose	Reid, John.
Morpeth	Schofield, F. E.
Neath	Hibbert, Walter.
Newark	Cherrington, Geo. W.
Newbury	
Newcastle-on-Tyne	Martin, Nicholas H.
Newcastle-under-Lyme	
Newmarket	Barrow, Frank Arthur.
Newport (Mon.)	Phillips, John.
Newport (Salop)	Barlow, John.
Newtown	Owen, Edward.
Northampton	Bingley, John.
Northwich	Humphreys, Griffith.
Norwich	Sutton, Francis.
Nottingham	Parker, William Henry.
Nuneaton	Iliffe, George.
Oldham	Hargraves, H. Lister.
Oswestry	Evans, John.
Otley	Lockwood, Thomas.
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	McNicol, John.
Pembroke	Treweeks, Rich. Harwood.
Penrith	Redfern, Tom.
Penzance	Buckett, Alfred Henry.
Perth	Donald, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Woods, William.
Pontefract	Bratley, William.
Pontypridd	Cule, Taliesin.
Poole	Pomeroy, Francis T.
Portsmouth, etc.	Childs, James L.
Preston	Sharples, George.
Prestwich	Mercer, Allan.
Radcliffe	Pollitt, Joseph Moore.
Ramsey (Hunts)	Palmer, Frederick Wm.
Ramsgate	Baily, Edward.
Reading	Loam, James G.
Redditch	Mousley, William.
Reigate	
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Parkin, Joseph Brooks.
Rochdale	Taylor, Edward.
Rochester	Watts, George Wm.
Romford	Lasham, John William.
Ross	Matthews, Thomas.
Rotherham	Horsfield, John M.
Rothesay	Duncan, William.
Rugby	Brown, Frederic P.
Ruthin	Rouw, Theodore J.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur E.
St. Andrews	Govan, Alexander.
St. Austell	Binks, Burcham.
St. Ives (Cornwall)	Young, Tonkin.
Saffron Walden	Gilling, John.
Salisbury	Atkins, William Ralph.
Scarborough	Whitfield, John.
Seacombe	Miller, William Hy.
Sevenoaks	Pain, Edwin.
Sheffield	Ward, William.
Shields, South	Noble, John.
Shipley	Dunn, Henry.
Shrewsbury	Cross, William Gowen.
Skipton	Wilks, Robert.
Southampton	Dawson, Oliver R.
South Molton	Swingburn, Richd. Hy.
Southport	Ashton, William.
Spalding	Asling, Brelsford.
Stafford	Averill, John.
Stalybridge	Simpson, Allwood.
Stamford	
Stirling	Shairp, William.
Stockport	Kay, Samuel.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Selleck, W. R.
Stowmarket	Gostling, George James.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Coley, Samuel James.
Sudbury	
Sunderland	Harrison, John.
Swansea	Grose, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Gregory, George Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Davies, Moses Prosser.
Thirsk	Foggitt, John B.
Tiverton	Havill, Paul.
Torquay	Smith, Edward.
Totnes	Morse, Charles H. S.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Tynemouth	Stobbs, Robert.
Uttoxeter	Jaques, George.
Ventnor	Weston, Charles.
Wakefield	Wice, Jonathan H.
Walsall	Elliott, George.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wellington (Salop)	Bates, James.
Wellington (Somerset)	Windeatt, George Jas.
Wells (Somerset)	Manning, R. J.
Westbury	Paine, Charles.
West Bromwich	Roberts, George.
Weston-super-Mare	Gibbons, George.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Widnes	Jackson, Alfred.
Wigan	Phillips, Jonathan.
Wimbledon	Dowdeswell, Jonathan.
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wisbech	Maxey, John Thomas.
Wokingham	Spencer, Thomas.
Wolverhampton	Gibson, Fredk.
Woodbridge	Betts, John.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wrexham	Edisbury, J. F.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, William S.
Yeovil	Maggs, Frederick R.
York	Sowray, Joseph.

In reply to Mr. EVANS, the PRESIDENT explained the regulations under which a town is entitled to have a Local Secretary.

THE PRIZE COMPETITIONS.

On the motion for appointing gentlemen to conduct the examinations for the Council Prizes and the Jacob Bell Scholarships,

Mr. SYMES asked if there was any reason why the Council prizes should not be competed for at local centres, instead of only in London and Edinburgh. If there were anything in the regulations which prevented this

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being done, he would not say more, but he understood that the Council was desirous of doing all it could to assist local centres, and was looking forward to the time when they would become educational centres. As this was a written examination he did not see why it should not be conducted at local centres in the same way as the Preliminary examination.

The SECRETARY said the examination was held at a different time.

Mr. SYMES said that was not the question. It was rather a tax on young men to come one or two hundred miles to an examination, and many more would probably compete if all the local centres could be utilized for the purpose.

The PRESIDENT said the matter was considered some years ago, and for the present, the examination being so near, he did not see that the Council could depart from the published regulations that the examination should take place in London and Edinburgh.

Mr. SYMES said he should be perfectly willing to leave the matter in the hands of the Library and Museum Committee to consider. It was only seeing the subject on the agenda paper which brought it to his attention, but he had known several cases in which young men in Liverpool would have gone in for these prizes if they could have done so without coming to London or Edinburgh.

Mr. NEWSHOLME also spoke from his own knowledge of young men being prevented from competing owing to the necessity of going so far. If it were not possible to make an alteration this year he hoped the subject would be considered before next year.

The PRESIDENT said the object of the Council of course was to promote as good a competition as possible. He would undertake to bring the matter before the Committee at an early opportunity.

Mr. BAILDON asked if there would be an examination for the Jacob Bell Scholarships in Edinburgh this year.

The PRESIDENT said, Yes. Wherever there were candidates at a local centre, an examination for the Bell Scholarship was held.

Messrs. Ransom and Thresh were then unanimously appointed examiners for the Council Prizes, and Messrs. Blunt and Bowen to examine the papers for the Jacob Bell Scholarships.

RESIGNATION OF PROFESSOR BENTLEY.

The PRESIDENT read a letter from Professor Bentley thanking the Council for the resolution passed last month, expressing the intention to appoint him Emeritus-Professor of Botany at the termination of his present appointment.

A letter was also read from the Society's employees, thanking the Council for the gratuity voted last month, on the occasion of the Jubilee.

ELECTION OF A MEMBER OF COUNCIL IN PLACE OF MR. WILLIAMS.

The PRESIDENT suggested that the Council might like to go into committee to receive nominations.

Mr. EVANS saw no necessity for doing so.

Mr. SCHACHT moved that the Council go into committee.

Mr. RADLEY thought it unnecessary, as the Council might vote on this matter without discussing the qualifications of the gentlemen nominated, of which they were all pretty well aware.

Mr. EVANS expressed his desire to move as an amendment that the Council do not go into committee.

The PRESIDENT said that was hardly an amendment; the usual way was to vote for or against such a motion at once without discussion.

Mr. HAMPSON asked if there were any regulation which prevented such a motion being discussed.

Mr. RICHARDSON thought it was the unwritten law.

The PRESIDENT said it was usual in all public bodies for such a motion to be put at once without discussion; otherwise the whole object of the motion might be frustrated by discussing the main question under the form of a motion to go into committee.

The motion was then put and carried by 8 votes to 7.

The Council accordingly went into committee, and after a discussion a ballot was taken.

On resuming,

The PRESIDENT declared the result of the ballot to be as follows :—

For Mr. Butt, London, 14; Mr. Martin, Newcastle, 4; Mr. Watt, Haddington, 1.

On the motion of Mr. BOTTLE, seconded by Mr. SYMES, Mr. Butt's name was added to the Benevolent Fund, Library, Museum, Laboratory and House, Law and Parliamentary, and Building Committees.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee included a recommendation that the contractors for the new building might during July receive a further payment on account, not exceeding £1000, on the architect's certificate. Sundry other accounts were also recommended for payment.

The PRESIDENT moved the adoption of the report and recommendations, which was seconded by Mr. RADLEY and carried unanimously.

The sale of £3000 New Three per Cents for building expenses was authorized.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to a registered chemist and druggist (aged 40), suffering from chronic disease and deafness. Applicant has had two previous grants. (Lancs)

£10 to widow (aged 54) of a registered chemist and druggist. Has had two previous grants. (Lancs.)

One other case had been before the Committee, but had been deferred for further consideration.

The VICE-PRESIDENT moved the adoption of the report and recommendations, which was carried unanimously.

Mr. RICHARDSON asked if any communications had been received from the annuitants in response to the extra gratuity which was given them last month in connection with the Jubilee.

The SECRETARY said all those who came to the office to receive the gratuity had expressed themselves as very grateful for the gift, and it was remarkable how opportune they all seemed to find it, each having some special expenditure this year for which it was required. He had also received several grateful letters, one of which was from the first annuitant elected, in 1865, who said he was ninety last February, and recollected George III.'s Jubilee, and that he was very grateful to the Council for the gift, which was extremely useful to him.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Day . . .	453	27	5	18
	Evening .	112	13	0	6

Circulation of books.	Town.	Country.	Total.	Carriage paid.
May	145	136	281	£1 14 5½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Paris (J. A.), Pharmacologia, 7th ed, 1829, 2 vols. From Mr. J. F. BROWN, of Dover

Vogl (A. E.), Anatomischer Atlas zur Pharmakognosie, 1887. From the AUTHOR.

Bernays (A. J.), Notes on Analytical Chemistry, 2nd ed., 1886. From the AUTHOR.
Radcliffe Library, Catalogue of books added during 1886. From the RADCLIFFE TRUSTEES.
Quekett Microscopical Club, Twenty-first Report, 1887. From the CLUB.
Hospitals Association, Proceedings, vol. 3, 1885–86. From the ASSOCIATION.
Wills (G. S. V.), Manual of Vegetable Materia Medica, 9th ed., 1886. 2 copies. From the AUTHOR.
Paz (C. da), A questão dos vinhos, os vinhos falsificados, 1886. 2 copies.
— Lição inaugural do Curso de chimica organica e biologica, 1887. From the AUTHOR.
Ernst (A.), La exposicion nacional de Venezuela en 1883, tomo 1, texts, 1886. From the AUTHOR.
Dragendorff (G.), Ueber eine Vergiftung, 1887. From the AUTHOR.
Senier (A.), Ueber Cyanursäure, ihre Isomeren und Derivate, 1887. From the AUTHOR.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Flora of Hertfordshire.
Fearnley (W.), Practical Histology, 1887.

The Committee recommended that the Library Catalogue be revised, and that an edition of five hundred be printed.

Museum.

The report of the Curator had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Morning .	413	34	5	17
	Evening .	67	10	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors : —

Specimen of Strophanthin.
Specimen of the seeds and volatile oil of *Evodia fraxinifolia.* From Mr. H. HELBING.
Specimen of *Gymnema sylvestre.* From Dr. BIDIE, Madras.

A series of duplicate specimens of materia medica had been forwarded to the Leicester and Leicestershire Chemists' Association.

An application had been received from Dr. J. Léon Soubeiran, for a series of samples of fatty substances for a scientific investigation.

Also from the Director of the Botanic Gardens, Jamaica, for commercial specimens of medicinal products for comparison with those produced in the island.

The Professors had attended and reported on their respective classes.

This Committee had drawn up an address to Her Majesty on the occasion of the Jubilee, which had been already published in the Journal.

The appointment of a Professor of Botany and the question of giving demonstrations in materia medica had been considered at three meetings of the Committee, at the last of which the President had reported that he had ascertained that the Curator of the Museum was willing to undertake the teaching and demonstrations in materia medica.

The PRESIDENT in moving the adoption of the report, said he was glad to announce that Mr. Holmes, the Curator, had undertaken to give the demonstrations in materia medica, and it was proposed to advertise for a Professor of Botany.

The Council went into committee, while the President gave further details as to the proposed arrangements in connection with the teaching of materia medica.

On resuming, the motion was agreed to unanimously.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

It was resolved that written examinations be held in the same centres as last year, and that the appointment of Superintendent be offered in the first place to the Local Secretaries, except in London, Edinburgh, and Guernsey.

The SECRETARY presented the following report on the Preliminary examination :—

PRELIMINARY EXAMINATION.

List of Centres and Table of Attendances of Candidates at each Centre.

	1884. Jan., Apr., July, Oct.	1885. Jan., Apr., July, Oct.	1886. Jan. Apr., July, Oct.	1887. Jan.,	1887. Apr.	Total number of attendances at each centre at 14 examinations.
ENGLAND AND WALES						
Birmingham	67	62	64	12	20	225
Brighton	14	12	11	2	7	46
Bristol	36	34	55	5	14	144
Cambridge	20	8	15	1	4	48
Canterbury	9	17	9	2	5	42
Cardiff	32	34	41	9	7	123
Carlisle	20	27	24	11	12	94
Carmarthen	40	56	46	12	23	177
Carnarvon	33	31	29	5	3	101
Cheltenham	4	7	5	2	4	22
Darlington	26	20	22	10	8	86
Exeter	35	33	41	4	13	126
Hull	22	21	19	1	7	70
Lancaster	20	18	17	5	11	71
Leeds	64	71	55	15	12	217
Lincoln	28	20	35	10	8	101
Liverpool	52	58	50	17	18	195
London	163	170	169	30	37	569
Manchester	101	95	85	27	38	346
Newcastle	32	35	35	11	12	125
Northampton	17	17	16	0	5	55
Norwich	19	25	33	8	4	89
Nottingham	37	46	48	12	16	159
Oxford	8	6	7	3	2	26
Peterborough	20	19	18	9	6	72
Sheffield	19	22	26	3	12	82
Shrewsbury	16	17	21	5	6	65
Southampton	28	36	29	4	11	108
Truro	9	15	14	5	8	51
Worcester	11	8	7	2	4	32
York	21	20	25	6	14	86
SCOTLAND.						
Aberdeen	43	45	44	10	8	150
Dundee	34	29	35	6	8	112
Edinburgh	86	85	87	12	29	299
Glasgow	57	41	52	9	15	174
Inverness	12	13	7	2	8	42
Douglas, I. of Man	4	3	5	2	0	14
Guernsey	1	0	2	3	1	7
Jersey	6	2	2	1	0	11

LAW AND PARLIAMENTARY.

At a meeting of this Committee the President had reported the result of an interview with Sir B. Walter Foster, M.P., who had stated the reasons he had given for the amendment he suggested. It had been resolved that the President, with the assistance of the Solicitor, should prepare such an amendment as would meet the objections of Sir B. Walter Foster.

The PRESIDENT moved the adoption of the report. He said the present state of business in the House of Commons was rather depressing from their point of view, but he was in hopes that as the Bill had passed the

House of Lords and several stages in the Commons, it might receive consideration towards the end of the present month.

The motion was unanimously agreed to.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor reporting upon cases which had been placed in his hands.

J. W. Law, 78, York Road, Leeds,
had paid into court one penalty and costs.

A. P. Dyson, 178, Woodhouse Lane, Leeds,
had paid two penalties without the institution of proceedings.

Several cases of alleged infringement had been considered by the Committee, and in the majority of them proceedings were recommended.

The consideration of the memorial from Dover had been deferred.

The report of this Committee was as usual considered in committee.

On resuming, the PRESIDENT moved the adoption of the report. He might mention that in the case of a limited liability company trading as chemists and druggists and selling poisons under the title of "The Leith Depôt, Limited," proceedings had been instituted, with the result that the Sheriff had decided that the persons who were cited before him for using the title chemist and druggist, whether with or without the word "wholesale," were infringing the Pharmacy Act, and he had fined them all. There was another count charging one of the Company, David Ovens, with the offence of selling poison, he not being registered, and he, as well as another man, Wharton Thomson, were fined for that offence also. It had been stated by the counsel for the defendants that there would be an appeal, but as to that it would be necessary to await the course of events. The whole case would be found reported in the Journals of the 2nd and 9th instant.

The motion was unanimously agreed to.

A letter was read from the Secretary of the Leicester and Leicestershire Association thanking the Council for the gift of specimens.

REPORT OF EXAMINATIONS.
June, 1887.
ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (15th)	4	3	1
,, (16th)	5	3	2
	—9	—6	—3
Minor (15th)	20	9	11
,, (16th)	20	10	10
,, (17th)	24	15	9
	—64	—34	—30
	73	40	33

Preliminary Examination.

12 certificates were received in lieu of the Society's Examination.

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE PHARMACY ACT.
BREMRIDGE *v.* GRAY AND OTHERS.
(*Continued from page* 20.)
Thursday, June 30.
Decision as to Relevancy.

Sheriff Rutherfurd: In this case I have had the benefit of a very able argument from my brethren who are counsel for the parties on either side, but as the question raised appeared to be attended with some difficulty, and as it is undoubtedly one of general importance, I thought it better to continue the case until to-day, that I might have an opportunity of further considering the matter. The complaint is founded upon the Pharmacy Act of 1868, which proceeds upon the preamble *inter alia* that it is expedient for the safety of the public that persons known as chemists and druggists should possess a competent practical knowledge of their business, and to that end from and after a day herein named all persons not already engaged in such business should before commencing such business be duly examined as to their practical knowledge, and that a register should be kept as herein provided by the first section. It is enacted accordingly, that from and after December 31, 1868, it shall be unlawful for any person to assume or use the title chemist and druggist, or chemist, or druggist, or pharmacist, or dispensing chemist or druggist in any part of Great Britain, unless such person shall be a pharmaceutical chemist or chemist and druggist within the meaning of this Act, and be registered under this Act; and by the 15th section it is provided that from and after December 31, 1868, any person who shall take, use or exhibit the name or title of chemist and druggist or chemist or druggist not being a duly registered pharmaceutical chemist or chemist and druggist, shall be liable to a penalty of £5 as provided by that section of the Act. Now it is founding upon these statutory enactments that the Registrar under the Pharmacy Act, who is empowered to prosecute for the recovery of penalties, has presented this complaint, with the concurrence of the Procurator-Fiscal, against seven individuals named, and the first charge in the complaint is that these persons who are mentioned "did all, and each, or one or more of them, put up, use or exhibit, or cause or procure to be put up, used or exhibited, the name or title of chemists and druggists above or in connection with a shop at 49, Leith Walk, Leith, and in the county of Midlothian, occupied by them or by the Leith Depôt, Limited, of which they are the sole partners or shareholders, and also at another shop at No. 33, Ferry Road, Leith, in said county, occupied by them, or by the Leith Depôt, Limited, of which they are the sole partners or shareholders, none of the parties being a duly registered pharmaceutical chemist, or a chemist and druggist within the meaning of the said recited Act." Now, on the part of the respondents an objection has been taken to the relevancy of this charge, which, it was maintained on their behalf, should have been directed against the Leith Depôt, Limited, and not against them as individuals, because none of the respondents is alleged to have, as an individual, assumed the title chemist and druggist, but merely to have used or exhibited that title in connection with the premises occupied by the Company. Now, I must assume, in so far as concerns this particular charge, that none of the respondents did assume the title chemist and druggist in his or her individual capacity. They did not put it on their visiting cards or on the door-plates of their private dwelling-houses. Nothing of that kind is alleged. But then the 15th section of the Act does not require that in order to constitute a statutory offence a person must make use of or exhibit the title chemist and druggist in his individual character, or in connection with his own name, and I am of opinion that to infer liability for the penalty it is sufficient that the partners or shareholders in a company of this kind, none of them having the qualification, assume the title in connection with the business carried on in the name of their firm or company. It must be kept in view that the leading purpose of the Legislature, as shown in the preamble of the Act, was the safety of the public, and it was with that end in view that it was judged expedient that persons known as chemists and druggists, that is, persons who deal in chemicals and drugs, should possess a competent practical knowledge of their business. If not one of the partners in a company of this kind is required to be a

duly qualified chemist or druggist the purpose of the Act would manifestly be easily defeated; there would be nothing to prevent any seven persons from setting up a business for the sale of poisons and other drugs under the name of a company registered under the Companies Acts, and adding the designation chemists and druggists; they would by this device of uniting themselves into a company evade the Act in a way which no single individual could possibly do it. For it has been decided, and I must assume rightly, by the House of Lords, in a case cited in the course of the discussion—the Pharmaceutical Society *v.* the London and Provincial Supply Association—that the word "person" as used in the 1st and 15th sections of the Act of 1868 does not include a corporation, the reason being that it is not possible for a corporation to qualify. A corporation cannot offer itself for examination, and go through the other preliminaries required by the statute, and, accordingly, it was held that any prosecution for such penalties must be instituted not against the body corporate, but against the individual offender. But the very fact that a company cannot qualify shows conclusively, to my mind, that the title chemists and druggists, if adopted in connection with the name of the Company, and the business carried on by the Company, could only be assumed by individual shareholders who could get the statutory qualification, or at all events by some of their number, and that this prosecution has therefore been properly directed against them. It has been said that this view is contrary to the opinions expressed by some of the noble and learned Lords in the case to which I have referred. I think that so far from being so it is only carrying the opinions of their Lordships to their just and logical conclusion. A great deal of light is thrown upon the case of the London and Provincial Supply Association by turning to the reports of what was done in the Queen's Bench Division, and afterwards in the Court of Appeal, whose judgment was affirmed by the House of Lords. The decision in the Queen's Bench, if it had been affirmed, would have led to the result that no corporation could carry on the business of chemist and druggist, even although all its members were duly qualified, and it was, I think, in connection with that view of the matter, and by way of deprecating that result, that, in the case cited, the Lord Chancellor and Lord Blackburn expressed themselves as they did in those passages of their opinions which are founded upon by the counsel for the respondents in the present case. The company was sought to be made liable in a penalty for selling poison, although the person by whom the sale was effected, who was himself a partner of the company, was a duly qualified chemist and druggist. That was manifestly a very different case from this, where the prosecutor alleges that not one of the partners has the necessary qualifications. According to the judgment of the House of Lords the proceedings must be taken not against a company, but against an individual wrongdoer, and that is just what the prosecutor has done here. I therefore repel the objection to the first charge. A similar objection was also stated to the second charge in the complaint, and I would deal with it in a similar manner. But I wish to point out that the second charge is to this effect, that the parties named did, "unlawfully and in contravention of the said 1st and 15th sections of the said recited Act, issue to the public, or cause, or procure to be issued to the public, printed circulars, labels, and advertisements, having the word chemists and druggists printed or written thereon," none of the parties named being a duly registered pharmaceutical chemist or a "chemist and druggist" within the meaning of the Act. Now what does that mean? I think there is a want of specification there. It could hardly be maintained that it was an offence under the statute to print the words chemist and druggist upon a label or a blank piece of paper, and disseminate these in any number through the country; it should have been said that this was done in connection with the business carried on only by the Leith Depôt, Limited.

Mr. Shaw: Yes, it will be so stated.

Sheriff Rutherfurd: Then it was objected on the part of respondents to the relevancy of the third and fourth charges that the prosecution has not been brought within the period of six months which is laid down by the 13th section of the Act of 1852. I am of opinion that that objection is well founded, and I therefore sustain the objection to the third and fourth charges. The fifth charge was not objected to, and the sixth charge was withdrawn by the prosecution. So that disposes of the whole matter, and I will now go on to hear evidence in support of the first, and second, and fifth charges.

Mr. Orr: And the separate complaint against Thomson.

Sheriff Rutherfurd: And also the separate complaint against Thomson, against which there is no objection.

Mr. Orr: No objection.

Mr. Orr said: At this point, I would intimate an appeal on the question of relevancy, but probably that matter will be taken up afterwards.

Mr. Morison (to the Sheriff): Your Lordship has to hear the evidence. It is a case stated, and there must be a conviction, or the complaint dismissed.

The Sheriff: Yes, I can dispose of that, and then the whole thing will be taken up together.

Mr. Shaw: I propose to add to the words "issue to the public, or cause or procure to be issued to the public," in the statement of the second charge in the complaint, the words "in connection with the businesses or either of them carried on by the said Leith Depôt, Limited, of which they are the sole partners as aforesaid."

The Sheriff: Are the respondents guilty?

Mr. Orr: The respondents plead not guilty. All the seven shareholders are not present. The two female shareholders are not here. I think it was arranged at the first diet that it would not be necessary for them to appear; and Fettes is not here.

Mr. Shaw: My friend had better put in a minute stating that certain of the respondents did not appear, and we will proceed in absence.

Mr. Orr: If you will put in a minute restricting the action to five or four of the seven parties.

Mr. Shaw: No. I understand that it has been arranged that diligence will not be done against the lady partners of this concern, and I accordingly adhere to any arrangement of that kind. To abandon the complaints against them at this stage, however, I think would hardly do.

Mr. Orr: I do not know that is necessary to put in any minute.

It was agreed that the same proof should apply to both charges.

Evidence for Complainer.

Robert McGregor, sworn and examined by Mr. Shaw: I am Depute Registrar of Joint Stock Companies. Our office is at No. 1, Parliament Square, Edinburgh. The folio number in the Register of Joint Stock Companies, applicable to the Leith Depôt, Limited, is 1575. The Leith Depôt is duly entered therein. Their registered office is given as 49, Leith Walk, Leith. I am now shown an extract which I produce setting forth the registered office, and it is correct. I am also shown a summary which I produce showing the partners and the shares held by each in the Leith Depôt, Limited, and that is also correct. In the Register, opposite the name of Andrew William Gray and under the head of occupation, there is the word "wholesale" in one line, and below it the words "chemist and druggist." In the case of David Ovens, the fourth shareholder, there are the words "chemist's assistant;" and in the case of the sixth shareholder, M. F. Fettes, she is recorded as being deceased. That leaves as the whole partners of the Company seven in number, being the seven mentioned in the complaint.

Mr. Orr: Does the document produced show the number of shares held by each shareholder?

Mr. Shaw: Andrew William Gray has 40 shares; Andrew Gray 120; Mrs. Gray has 430; David Ovens has 3; J. Fettes 2; Miss Fettes has 4; and William Taylor, who is a law clerk in Edinburgh, has 1.

Cross-examined by Mr. Orr: In the Register I think you say Andrew W. Gray is designed as a wholesale chemist and druggist?—In this summary of capital and shares and list of members he is designed wholesale chemist and druggist.

And in the same list David Ovens is designed as a chemist's assistant?—Yes: I presume it means assistant. It is a contraction that is used.

Compeared *John Rutherford Hill*, sworn and examined by Mr. Shaw: I am a pharmaceutical chemist and Assistant Secretary to the Pharmaceutical Society. My residence is in Edinburgh. I have been assistant secretary since February, 1886. I produce the Registers of Chemists and Druggists and Pharmaceutical Chemists for the years 1886 and 1887. I have seen the complaint in question, and have noticed the names of the parties who are sued in it, as set forth in the complaint. None of the names of Andrew W. Gray, Andrew Gray, William Taylor, Jane Maria Gray, David Ovens, James Fettes or Marjory F. J. Fettes, appears in the Registers which I have produced.

They are not qualified?—No.

I believe that you have often passed the shops at 33, Ferry Road, and 49, Leith Walk, which are occupied by the Leith Depôt, Limited, during the months from December to April last, and, indeed, on till now?—Yes. On these occasions I have seen the sign-boards and advertisements which are exhibited on the shops in question. Above the door of the shop at No. 33, Ferry Road, there is the sign "Chemists and druggists, tea-merchants and sponge importers," in prominent letters above the door. These are placed in the usual position for a sign. In approaching the shop from the west these are the only words that are seen. Then round the corner on the east side?—The words "The Leith Depôt, Wholesale," appear.

The word "wholesale" is not seen if you pass the shop from the west?—No. There is also a window on the east side looking into a recess there. There is a wire blind in that window, with the words "The Leith Depôt, Limited," painted on the top, and then there are the words "wholesale chemists, druggists, and tea-merchants," also in large gilt letters, quite prominent, and easily seen for a long distance.

There are on the glass door at the entrance of the shop certain words?—Yes, across the door.

You only see that when right in front of the premises?—Yes.

What is painted on the glass door?—"Leith Depôt, Limited," and over one half of it are the words "wholesale chemists and druggists."

The evidence you have just given applies to the premises 33, Ferry Road?—Yes.

Speak to the case of 49, Leith Walk, as distinguished from it.—On the glass door leading into the shop there are the words "wholesale chemists, druggists and tea merchants," in large gilt letters; these are on the lower part of the glass door.

Any other sign there?—Above the door are the words "Leith Depôt, Limited."

But no designation?—No designation.

And in the case of the words "Wholesale chemists, druggists and tea merchants," these are perfectly legible and distinct in prominent letters?—Yes,

Have you ever seen any of the circulars issued by the Leith Depôt, Limited, or by the shareholders?—Yes. In the beginning of May last, two circulars came under my notice. They came to me by post.

I show you a document, which we call No. 3, which is a price list for 1887, and is titled, "The Leith Depôt, Limited, Wholesale Chemists, Druggists, and Tea Merchants, 49, Leith Walk, and 33, Ferry Road, Leith."—Yes.

That applies to the business that you have been referring to?—Yes. It came to me by post in the beginning of May. I have seen such or similar books since—large numbers of them.

And have you seen the books that you now hold in your hand in the windows of the shops in question?—Yes.

The front page, which I have just quoted to you, being quite legible from the outside?—Yes.

There is a witness who is to come here to-day—Alexander Coats. Do you remember him bringing you a circular?—Yes.

That is a circular of one sheet folded, the front of it being the same as the front of the book to which you have last spoken?—Yes, with the words "wholesale chemists and druggists."

And also on the back, printed transversely, are the words, "wholesale chemists and druggists and tea merchants." You got that from Alexander Coats?—Yes. I received it on February 16 of the present year.

And I understand you have seen a good many circulars such as that, and No. 2, which is another sample in a different colour?—Yes; large numbers.

Between the dates which are libelled in the complaint?—Yes.

And have you seen them also lying in the premises in question, in Leith Walk and Ferry Road, on the counter, to be picked up by customers in ordinary course?—Yes.

And I believe two circulars, of which No. 3 is a copy, also came to you by post in May of this year?—Yes.

And do you notice on No. 3. under the heading "General Remarks," on the second page of the white printed matter, it is stated that "the new Depôt is under the management of a thoroughly qualified pharmaceutical chemist of great and varied experience in England, Ireland, and Scotland;" is that statement correct?—No.

Is there a pharmaceutical chemist employed in either shop?—No. I have called at the shop myself, and am speaking from my own knowledge. In the month of April last I was in the office of the Registrar of Joint Stock Companies in Parliament Square. I saw the memorandum and certificate of incorporation, of which I am now shown an accurate copy. In it I observe the name of Andrew William Gray, with the designation "wholesale chemist and druggist;" and the name of David Ovens, with the designation "assistant chemist." I accompanied the witness Coats to the shop, No. 49, Leith Walk, on December 15 last. I saw him present a bottle and ask to have it filled with laudanum. David Ovens was in the shop attending to it. I know Ovens by sight.

You did not go inside, but you looked through the glass door, and saw and heard all that was going on?—Yes.

You saw David Ovens make the sale to Coats?—Yes. When Coats came out he handed me the bottle.

How much did he buy?—He asked the bottle to be filled.

You have the bottle here, which you are ready to produce if required?—Yes. I produce it. [Marked No. 4.]

You have analysed the contents, and you find them to be laudanum, which is a preparation of opium and a poison within the meaning of the Act?—Yes.

Were you present when some oxalic acid was sold?—No.

On the bottle which was furnished in your view to Coats, the word "laudanum" is in writing above the words "The Leith Depôt, Limited, 49, Leith Walk, Leith," which are in print, and then below is the word "poison"?—Yes.

On the 18th of May you instructed Coats to go to the shop, No. 49, Leith Walk, and make a purchase of oxalic acid?—Yes. I did not accompany him. On the 20th

of May Coats brought to me a packet containing oxalic acid.

That is it which you now produce?—Yes. [Packet produced and marked No. 5.]

He brought this to you in answer, as you understood, to your direction and order?—Yes.

The Sheriff: Where did you tell Coats to go?

Witness: To 49, Leith Walk.

The Sheriff: To buy oxalic acid?

Witness: Yes.

Examination continued: The packet is labelled "oxalic acid, poison"?—Yes.

You have analysed it and know that it represents what it bears to be?—Yes.

Oxalic acid is a poison within the meaning of the Act?—Yes.

You have seen also the notices and circulars that you have spoken to, and labels which are issued in the shop, and envelopes containing prescriptions; and you produce one of these (marked No. 6) containing the words "Leith Depôt, Limited, wholesale chemists and druggists, 49, Leith Walk?"—Yes.

I show you a small cork (marked No. 7) with the usual label affixed to the top of it; that label has upon it the words "Leith Depôt, Limited, Chemists."—Yes.

That is the kind of cork which you have seen to be used in the business of the Leith Depôt, Limited, at both of those shops?—Yes.

Have you seen this individual cork before?—I have seen this one before.

Was it you who procured that one for the purposes of this case?—I picked it up in a chemist's shop in Leith.

Containing this label which I have read?—Yes, "Leith Depôt, Limited."

Are you aware that in the dispensing business carried on at these places similar corks and labels are used?—Yes.

You know that of your own knowledge?—Yes.

Then with regard to the prescription?—I also picked that up; I picked up a large number, of which that is one, in various shops in Leith.

When you have a prescription, you do not necessarily go back to the same shop with it: you may go to another shop to get it dispensed?—Yes.

Other envelopes may have found their way to other shops?—Yes.

With the words "Leith Depôt" on them?—Yes.

And that is how you came by them?—Yes.

And the same with the labels?—Yes.

Do wholesale chemists use such prescription labels?—No.

These are used, as you know, in retail business?—Only, in retail business of a dispensing kind.

Cross-examined by Mr. Orr: I suppose that wholesale chemists who also carry on a dispensing business use similar labels?—In connection with their retail business.

In the price list which you produced, your attention, was directed to a page headed "General Remarks"?—Yes.

Do you see on that page a statement to this effect, that the "Leith Depôt, Limited, opened, on March 17 last, another depôt at 33, Ferry Road. The business at the 'Walk' will be conducted as formerly, with the exception that there is now a larger and more efficient staff of fully qualified men in the dispensing and retail departments"?—Yes.

And you see at the bottom of the page these words, "Dispensing departments—The Leith Depôt, Limited, employ none but qualified chemists and druggists in these departments"?—Yes.

These statements are contained in the list No. 3 which you produced?—Yes.

So far as you know, these statements are true? —I believe them to be untrue—the second statement.

The first statement I read was that they employed a more efficient staff of fully qualified men in the dispensing and retail departments; is it within your knowledge that the respondents employ an unqualified man or men in the dispensing departments at Leith Walk?—Yes, I believe that to be so.

You believe that they employ no qualified men?—I believe that they employ unqualified men.

You say they employ no qualified men?—They employ a qualified man.

Is it within your knowledge that they employ at Leith Walk more than one qualified man?—No.

What do you mean? Do you mean that they do not employ more than one qualified man?—I only know of one.

They may employ more than one qualified man?—They may.

What about the Ferry Road shop?—So far as I know, there is only one qualified man employed there.

Do you know the names of these two men?—Nicholas Dodds. He is a qualified man. He is at Leith Walk.

And at Ferry Road?—Henry Forwell.

He also is a qualified chemist?—Yes.

Do you know whether or not a man named Bainbridge is employed in the Leith Walk?—No.

Do you know of a chemist named Bainbridge?—No.

Can you tell me whether, so far as you know, the respondents have ever employed more than one qualified man at Ferry Road?—No.

You instructed Coats to make the purchase both of the laudanum and the oxalic acid?—Yes.

That was for the purpose of making a case against the respondents?—Yes.

The Sheriff: That is just what is done every day under the Public Health Act by the inspector.

Mr. Orr: And I think that was held not to be legal, at all events before the Act was amended.

Cross-examination continued: You went to the door with Coats, but you did not go into the shop?—That is so.

Were you peering through the glass door?—I was looking through it.

Did you see who supplied Coats?—Yes.

Had Coats any prescription with him?—No.

And you saw Ovens supply him?—Yes.

Can you say whether or not there was a qualified man in the shop at the time?—There was none.

You say so?—Yes.

You, not being in the shop, swear there was no qualified man there at the time?—Yes.

Where is the dispensing department in the Leith Walk shop?—At the back part of it.

That is to say, the part furthest away from the door? Yes.

And I suppose, like other dispensing departments, it is shut off or shelved off from the rest of the shop?—Yes.

And the dispenser works behind this enclosure?—Yes.

Where, according to your experience, would the laudanum bottle in a chemist's shop naturally be kept?—There is no particular place.

Would it not naturally be kept in the dispensing department?—No, not necessarily.

Have you anything to do with keeping a chemist's shop?—Not now.

Had you ever?—Yes.

It was not your practice to keep the laudanum bottle in the dispensing department?—The practice varies. In some cases the practice is simply to keep the bottle in the shop, and not in the dispensing department.

So that any apprentice could supply a customer out of the bottle?—Yes.

Although he was not a qualified chemist?—He might do so.

And for aught you know that may have happened in this case, where the laudanum was kept as I have described?—I have no doubt it has.

That is a common enough thing in chemists' shops?—

I cannot say. My experience is to the contrary. Apprentices are not as a rule allowed to do so.

Is it common to keep the laudanum in the dispensing department?—In many shops the dispensing department and the shop are synonymous.

Take the case where the dispensing department is more or less separate?—It might be kept in the dispensing department or in the open shop.

The one is as common as the other?—Yes.

Of course, where it is kept in the open shop there was nothing to prevent any assistant from supplying a customer?—No.

Then there was a dispensing department at the back end of the shop?—I regarded it as such.

You cannot say whether or not a qualified chemist was there at the time?—He was not there.

You say so, not being in the shop yourself?—Yes.

How do you know?—You could see distinctly from the front whether there was anyone there from where I stood.

You think there was no qualified chemist in the shop at all?—Yes.

The Sheriff: Did you see anybody except Ovens and Coats?—There was a lady there waiting for medicine apparently—no one else.

Cross-examination continued: I was looking through the glass door.

You say you saw everybody that was in the shop?—Yes.

And everything that was going on?—Yes. There was no one except Ovens, Coats, and the lady waiting for medicine that was being dispensed by Ovens.

Then of the staff there was simply Ovens there?—Quite so.

Do you know what the staff in the Leith Walk shop consists of?—I knew what it consisted of at that time.

How many?—Three.

Who were they?—Mr. Gray, Mr. Ovens and Mr. Dodds, and there were also message boys.

You could see the dispensing department from the outside of the door?—Yes.

Have you passed or looked into the shop recently?—Yes.

I suppose the dispensing department is in the same place still?—There is a slight alteration about the back place.

The dispensing department is at the same place?—In the same position.

You instructed Mr. Coats to go for the oxalic acid?—Yes.

And he got the packet No. 6 which you have produced?—Yes.

I suppose it is the usual thing for chemists to keep oxalic acid made up in packets ready for sale?—No, it is usually put up at the time of sale.

According to your experience?—Yes.

You have had no experience of it being kept in packets ready made up?—I have.

That is done too?—Yes; but it is very exceptional.

How much is the packet produced—in money?—A pennyworth.

Is it not the case that chemists very frequently keep penny packets ready made up for sale?—No; it is quite uncommon.

What is oxalic acid used for?—It is generally used for cleaning purposes.

And made up with blue for washing purposes?—Sometimes. It is also used for cleaning brasses.

A great deal of it will be asked for in the ordinary course of business?—Yes.

A great many packets are sold?—Yes.

People do not come with prescriptions for it?—No.

They simply come and ask for a penny packet?—Yes.

How is it supplied according to your experience?—Just as it was supplied in this case.

What is your experience in that way? The lad at the counter makes up a packet?—In some cases he might do so.

In some cases he does?—Yes.

Is not that just the thing that happens in the ordinary case?—No.

What is the other way?—As a rule those packets would be sold by some person who was competent to make such a sale. In the case of any person who knew nothing about it, he would require to consult some person in the shop who was competent, before he could sell it.

Have you had any experience in the sale of oxalic acid?—Yes.

Is it not the ordinary case that an apprentice at the counter makes up and sells a penny packet to the customer?—Yes.

The Sheriff: You are speaking of a regular chemist's shop?—Yes, under the supervision of a regularly qualified chemist.

Cross-examination continued: And for aught you know, that is what took place here?—I believe it might be done, for aught I know of my own personal knowledge.

Where, in the ordinary case, would the oxalic acid be kept?—In a drawer or bottle; there is no uniform practice.

Just in the open shop?—Yes.

The Sheriff: I thought the oxalic acid had been kept in a bottle?—It was put up in a packet.

Cross-examination continued: I suppose that pennyworths of oxalic acid are sold by drysalters and grocers, and the like?—That is an offence under the Act.

Is that not a fact?—I believe it is done. We frequently have to prosecute for it.

How many drysalters have you prosecuted?—I could not give you the number. We have to deal with about 200 cases of infringement every year.

How many cases have you prosecuted in Edinburgh?—None; I am not aware that the thing is done in Edinburgh.

Do you not know that it is done every day—pennyworths of oxalic acid sold by drysalters and grocers?—I do not believe it.

Where did you find the cork No. 8 which you were shown?—In a chemist's shop in Leith—Mr. Coats, Tolbooth Wynd, a brother of the lad Coats, whom I sent in to respondents' shops.

Have you seen any other cork with this label on it?—No.

Is it the only cork you have seen with this label?—Yes.

Look at the circular you produce (No. 4)—you see a statement on the second page to the effect that some two months ago the Leith Depôt, Limited, added to their business a dispensing department under the charge of a duly qualified assistant?—Yes.

And that is true?—I do not think they added it; it was there, as I understand, before that.

Mr. Orr: The circular has no date on it; you do not know when it was issued?

The Sheriff: When did you first see one of these?

Witness: On February 16.

Cross-examination continued: It says that two months ago the Leith Depôt, Limited, added to their business a dispensing department under the charge of a duly qualified assistant; you do not know anything to the contrary of that?—I believe the contrary is the truth—that they did not add a dispensing department at that time, but that it was there previously.

Previous to the two months before this circular was issued?—Yes. I think it would be issued in January or February. They refer to the opening of the shop on March 17 at 33, Ferry Road, and I know that I received a copy of the circular from my assistant shortly after it was issued. We were looking out for a copy.

The Sheriff: If they refer in that circular to the opening of the shop on March 17, then it must have been subsequent?—They refer to the prospective opening.

Cross-examination continued: At all events it is consistent with your knowledge that they did add to their business a dispensing department under the charge of a duly qualified assistant?—No, I do not think they added it then.

They added it at some time after they started?—Yes, but not at the time referred to.

The sign on the glass door of the Leith Walk shop, I understand you to say, is "Wholesale Chemists, Druggists, and Tea Merchants?"—Yes.

And what is above the door?—"The Leith Depôt (Limited)."

You are sure that is all?—There are other words on each side—"patent medicines, fancy goods, tobacco, tea," and so on.

"Sold at wholesale prices"?—No, I cannot say that I saw those words.

Are those words there?—I cannot say; they may be there.

Then, at the Ferry Road shop, what is the sign above the door?—"Chemists, Druggists, Tea Merchants, and Sponge Importers."

The word "wholesale" appears?—Round the corner.

Above the door?—No; there is a small recess at the east side of the shop, and the word is on the wall round in the recess.

Is the shop in a circle or half-circle?—It is a kind of diagonal with a corner facing the east.

Begin at the one side and read the sign right across?—"The Leith Depôt (Limited), Wholesale Chemists and Druggists, Tea Merchants, and Sponge Importers."

That is from all sides?—That is right along from all sides.

Where does the word "wholesale" come in?—Round the corner. The continuous sign reads "The Leith Depôt (Limited), Wholesale Chemists, Druggists, Tea Merchants, and Sponge Importers." On the wire blind and glass door are the words "Wholesale Chemists and Druggists."

Are you acquainted with any wholesale chemists or druggists?—Yes.

Are all the wholesale chemists and druggists that you know qualified?—Yes, I think so, so far as I can remember.

Can you say whether or not wholesale chemists and druggists are, as a rule, qualified or not?—So far as I know, they are qualified.

So far as you know, they are all qualified?—I would not say all.

You know that there are many wholesale chemists and druggists unqualified?—I could not name any.

A few?—No, I cannot say that, speaking from my own knowledge.

You cannot say whether or not wholesale chemists are qualified chemists under the Act?—My opinion is that they are.

How many wholesale chemists do you know?—I cannot say.

The Sheriff: They are all qualified that you know?—All that I know.

Cross-examination continued: All the ones that you know are qualified?—Yes.

There may be some unqualified?—I do not know. I know the firm of Lang and Barker, wholesale chemists, in Edinburgh. I believe they are qualified.

Do you know that they are not qualified?—My information is that the partners are qualified.

Re-examined: The copy of the memorandum of association is an accurate copy.

You find that the third purpose is that the company are to carry on the business of wholesale and retail chemists and druggists as well as that of selling tea, tobacco, and so on. From all that you know and have seen—and you have frequently seen the premises and the business there—it is the business a retail business?—Yes.

And the transactions in question, of which you have specifically spoken, were retail dispensing transactions?—Yes.

With regard to Dodds in the Leith Walk shop, and Forwell in the Ferry Road shop, are they pharmaceutical chemists?—No, they are chemists and druggists.

That is a sort of minor title?—Yes.

You have been asked about a man named Bainbridge; there are two Bainbridges on the Register of Chemists and Druggists, none of those gentlemen live in Edinburgh?—One of them lives at Stockton-on-Tees, and the other in London.

There is no other gentleman of that name who is a chemist and druggist, or a pharmaceutical chemist?—No.

You were asked as to where the dispensing of the drugs took place in the premises in Leith Walk; the dispensing that you have seen has been the dispensing of the laudanum in question?—It took place in the front shop by the hand of Ovens.

You saw that?—Yes.

Did he go into the back shop to consult anybody?—No.

Or go in at all?—No.

At the time you speak of, you could see quite well into the back shop, and could have seen any consultation going on?—Yes.

You say nobody was there?—Yes.

The laudanum was got from the front shop?—Yes.

And got without Ovens going into the back shop for any purpose whatever?—Yes.

You saw him go to the bottle in the front shop, pour out the laudanum, and hand it to Coats?—Yes.

You have been asked as to the practice of an unqualified man supplying laudanum; there may be such a practice, but it is a wrong practice?—Yes.

And where that is done in ninety-nine cases out of a hundred there is present in the shop a qualified man supervising?—Yes.

Do you think, where an unqualified man takes upon himself this duty, that that involves a considerable amount of danger?—Undoubtedly.

Then in the case of oxalic acid, that is a deadly poison?—Yes.

The Sheriff: They are both poisons within the meaning of the Act.

Re-examination continued: You have seen certain other notices or advertisements of the business in question, and I show you the *North Leith Parish Magazine* (No. 10) for the month of May, 1887. You observe there an advertisement, on page 18, of the Leith Depôt, Limited, wholesale chemists and druggists, with the words "Prescriptions dispensed at the lowest possible prices"?—Yes.

That applies to the shop, 49, Leith Walk, and also to the shop, 33, Ferry Road?—Yes.

I show you the *Leith Herald* of May 7, 1887 (No. 11), which also contains an advertisement, extending to a column, in connection with the "Leith Depôt, Limited, wholesale chemists. druggists and tea merchants;" in that advertisement there are the words, "we employ none but qualified chemists and druggists in this department,"—to your knowledge is that an accurate statement?—No.

I show you the *Leith Herald* of April 9, 1887 (No. 12). That contains an advertisement on p. 1: "Dispensing at reduced rates," and so on—"The Leith Depôt, Limited, wholesale chemists and druggists, 49, Leith Walk," and it also refers to the premises at 33, Ferry Road. You are quite aware that advertisements of that kind have been largely circulated?—Yes.

By Mr. Orr: I think all the circulars and advertisements which you have produced represent the Leith Depôt, Limited, as wholesale chemists and druggists?—Yes.

Have you ever been in the premises at 49, Leith Walk?—Yes. I have never been in the Ferry Road shop.

How often have you been in the Leith Walk shop?—Once, about the end of November, 1886.

Do you represent that the respondents do solely a retail business?—So far as I know, it is entirely a retail business.

Robert McGregor (recalled). Examined by Mr. Shaw: I show you (No. 9) copy of the certificate of incorporation of the Leith Depôt, Limited, and memorandum of association; the principal of these documents is in your office?—Yes.

And is this copy accurate?—Yes.

Alexander Coats, sworn and examined by Mr. Shaw: I am seventeen years of age. I am a medical student. I was assistant to my brother, who is a chemist in Leith, and before that I was assisting Mr. Hill, the last witness. I remember, on December 15 last, calling at the shop, No. 49, Leith Walk, occupied by the Leith Depôt, Limited.

What was the object of your calling?—To purchase poison—laudanum. When I went to the shop I there found the man David Ovens in attendance.

What did you ask him for?—I produced a bottle, and it was to be filled with laudanum. He took the bottle and filled it with laudanum.

It was in the front shop?—Yes.

When he filled the bottle, he gave it to me and I came out. I paid him twopence. I handed the bottle which I had so received from Ovens to Mr. Hill.

(Shown No. 6).—And this is the bottle?—Yes.

Did Ovens go to consult anybody before dispensing?—No. He did not go away into the back shop and do anything.

He just did it all in the front shop in your presence?—Yes.

Mr. Hill was standing looking through the glass-door, seeing what was going on?—Yes.

The Sheriff: Was the bottle from which you got the laudanum in the front shop?—Yes. It was all done in the front shop.

Was there anybody in the shop except yourself and Ovens?—There was a lady.

Examination continued: There was nobody else attending to the business except Ovens?—No.

Did you notice what was on the glass door as you went in?—The words "Leith Depôt, Limited, wholesale chemists, druggists, and tea merchants." These words were printed in large legible letters. Above the door there were the words "Leith Depôt, Limited." I have been at the shop at 33, Ferry Road, which is also occupied by the Leith Depôt, Limited. On the front of that shop are the words "chemists, druggists, tea merchants, and sponge importers." There is a window looking into a small recess on the east side of the shop, and there is a wire blind in that window. On that blind there is printed in large legible letters to the following effect. "Wholesale chemists, druggists and tea merchants." There is a glass door by which you enter. On that glass door there are the words the Leith Depôt, Limited, and below, on one half of it, there are the words "wholesale chemists and druggists." On the 18th of May last, I remember being at the shop, 49, Leith Walk. I there saw Mr. Wharton Thomson, whom I now see in court.

I understand you thought his name was Fairweather?—Yes.

You told that to the people who are conducting this case?—Yes.

You know him quite well and identify him?—Yes.

Was there anybody in the shop except him?—Nobody in the front. There were two men in the back shop.

What did you ask for?—A pennyworth of oxalic acid.

What did Thomson do?—He went to a drawer behind him in the front shop and took out a packet, which he gave me. That packet is No. 6, which I am now shown.

That is the thing which he handed to you?—Yes.

Did he communicate with any one in the shop before doing that?—No. I gave the oxalic acid to Mr. Hill. He had sent me on the 18th of May for it, and I gave it to him on the 20th of that month.

Just labelled as we have it now?—Yes. I remember being at the Depôt in the month of February making a purchase.

On that occasion you noticed a number of circulars on the counter for the public, such as No. 1, which I show you?—Yes; I just took one of them.

Cross-examined by Mr. Orr: My brother is a chemist in Leith. I am not permanently employed in his shop, but I sometimes assist him.

Has your brother any qualified man in his shop besides himself?—No.

He has got some assistants?—Yes; one.

The Sheriff: He has no qualified assistant?—No.

Cross-examination continued: Did you notice, when you went into the shop at Leith Walk to buy laudanum, whether there was a dispensing department in the shop?—Yes. It was in the back, and also in the front too, partly.

There were two places?—Yes.

Shut off more or less from the rest of the shop?—No; it was all pretty open.

Was it just like the dispensing department of any other chemist's shop?—Something similar.

Were not those dispensing places railed off or shut off by wooden partitions from the shop?—No. I have never seen anything of that kind.

The dispensing places you have seen are quite open, like the rest of the shop?—Perhaps they have a special place for dispensing.

Did you see where the dispensing place was in this shop?—Yes. There was a place to prepare medicines facing you as you went in.

At the far end from the door?—Yes; there is a place at the back.

So that there were two places, both at the back of the shop?—There is a back shop and the place in the front.

Is there a dispensing place in the front shop at the far end?—Yes.

Could you see men inside that dispensing place at the far end of the shop?—Yes.

As you were standing at the counter, could you see the dispenser inside the dispensary?—Yes; if you were standing at the far end of the counter furthest away from the door.

Where were you standing—about the middle of the counter?—Yes.

From the place where you were standing could you see the dispenser inside the dispensary?—Yes.

Did you look?—I did, and saw no one. There was nobody in the place. I went back in May to buy oxalic acid.

Was there anybody in the dispensary at that time?—There were two men in the back shop. I did not know their names. I looked into it when I bought the oxalic acid and there was nobody there.

Could a man standing outside the door see into this dispensing place?—Yes, he could see about half of it; there is a desk that obscures part of it. That desk is between the front of the shop and the dispensary place.

And was there not a screen also?—I do not think I saw a screen.

Do you think a man looking in from the outside of the shop could see the dispenser in the dispensary?—No, I do not think so. Perhaps he could, but I cannot say so. I never tried the experiment.

The dispenser might well enough be there and a man looking in from the outside not be able to see him; is not that quite likely?—Yes.

How much laudanum did you ask for?—I asked him to fill the bottle. He filled it out of a bottle which I suppose contained laudanum, and I think that bottle was at his side.

At his back?—At his back.

The bottle was not standing by itself, it was amongst other bottles?—Yes.

At the man's side?—At his back. It was on a shelf. When I was buying the laudanum there was a lady in the shop, and the gentleman who served me served her also. She was in the shop when I went in.

You got the oxalic acid made up in a packet?—Yes.

Were the packets in a drawer?—No. The oxalic acid was in a drawer. It had not been already made up when I went in.

Who made it up?—It was Mr. Thomson. I cannot say that I had ever seen him before.

Who told you his name was Fairweather?—A friend of mine told me so. That friend was not in the shop with me. He told me that the name of the person was Fairweather. He said the name of the assistant in the shop was Fairweather.

There were more than one assistant in the shop?—Not at that time; there was just Mr. Thomson in the shop—the gentleman whose name I was told was Fairweather.

You were told his name was Fairweather by a person who had not seen him supply you with the oxalic acid?—Yes.

The Sheriff: Did you give your friend a description of the person who supplied you?—Yes, and he said that his name was Fairweather.

Cross-examination continued: When did you find out your mistake?—Mr. Hill told me about the mistake.

Was there a Mr. Fairweather at all?—No. Mr. Hill told me that the person's name was Wharton Thomson.

Mr. Hill was not in the shop at all, when you bought this packet of oxalic acid?—No.

Have you seen the sign above both the shops?—Yes.

And the word "wholesale" is on both of them?—Yes,

Re-examined: I see Mr. Ovens, the person who supplied me with the laudanum, in court.

David Redpath Thomson, sworn and examined by Mr. Shaw: I resided in Cochrane Place, Leith. I am in the employment of Messrs. William Nimmo and Sons, printers and publishers, in Leith. They received a written order, signed "A.W. Gray," which I now produce (No. 13), and the copy contained therein of an advertisement for the Leith Depôt, Limited. The order was to insert the advertisement in the *North Leith Parish Magazine*, and it was accordingly inserted in the issue of that magazine for the month of May. No. 14 is a copy of the magazine containing the advertisement. It was issued to the public on the first Monday of May. That magazine has a large circulation; I do not know the number exactly, but it is considerably above a thousand. The advertisement of the Leith Depôt is at page 18 of the magazine.

John Gardner, sworn and examined by Mr. Shaw: I am a partner of the firm of Messrs. Gardner Brothers, printers and publishers, in Leith. We are the printers and publishers of the *Leith Burghs Pilot*. We got an order to print a pamphlet for the Leith Depôt, Limited, a copy being furnished to us. The order was given by Mr. Andrew W. Gray, who was one of the partners of the Leith Depôt, Limited. (Shown No. 4.) That is a copy of the pamphlet referred to. In accordance with the order we printed and delivered 10,000 copies on or about February 9 of the present year. (Shown No. 15.) That is a copy of the *Leith Burghs Pilot*, of date April 9 last, containing an advertisement by the Leith Depôt, Limited, on the first page. The order for that advertisement was given verbally. The advertisement was practically a repetition of the pamphlet which we printed. It was Mr. Andrew Gray who gave us the order for the advertisement. A similar advertisement was inserted in each of the issues of our paper for several successive weeks. The paper is published every Saturday morning, and has a large circulation.

Alexander W. P. Hope, sworn and examined by Mr. Shaw: I am in the employment of Messrs. Stevens and Hope, printers and publishers of the *Leith Herald*. (Shown No. 16.) That is a copy of the *Leith Herald*, of date May 7 last. In it there is an advertisement of about a column in length for the Leith Depôt, Limited. It was I who took the order for that advertisement from the manager of the Leith Depôt, Limited, Mr. Andrew Gray. The paper is published every Saturday. The advertisement in question was repeated in the *Leith Herald* on some other occasions after May 7. Our paper has a good circulation.

William Paton, sworn and examined by Mr. Shaw: I am lithographic manager to Messrs. Mould and Tod, engravers, in St. James Square, Edinburgh. I remember my firm receiving an order for some red paper seals for the Leith Depôt, Limited. In accordance with that order we printed the seals, of which those on No. 17 are samples. The seal upon No. 8 is not the same exactly; the other seals bear the words "wholesale chemists and druggists," while that on No. 8 has the word "druggists" omitted. We supplied five different sizes of seals. The small ones bear the words "Leith Depôt, Limited, Chemists," while the larger seals have the words "Leith Depôt, Limited, Wholesale Chemists and Druggists, 49, Leith Walk." We printed off a thousand of each size.

And these were duly delivered shortly after the receipt of the order to the Leith Depôt, Limited?—Yes. The order was for one thousand of each size, and they may possibly have got part at first.

You supplied only six hundred of the small size, at that time?—Six hundred was the balance of the one thousand ordered. The order was given by Mr. Andrew W. Gray, representing the Leith Depôt, Limited. I remember about the month of October or November last Mr. Gray calling at the office of Mould and Tod as to the printing of prescription forms and envelopes for the Leith Depôt, Limited.

And I show you No. 18, a seidlitz powder packet, and No. 19, a prescription packet; in accordance with Mr. Gray's order, you printed 1000 of each?—Yes.

He gave you an order for 10,000 seidlitz powder labels and 10,000 prescription forms of different sizes, and you printed 1000 of each?—Yes.

How was the order completed and delivery made?—The bulk was delivered on January 18, while the remainder was delivered in the course of March and April.

Cross-examined by Mr. Orr: The order you got for the small circular labels to go on the top of the corks was in accordance with the samples which you produce, having the words the "Leith Depôt, Limited, Wholesale Chemists and Druggists, 49, Leith Walk, Leith," upon them. On the label attached to the cork No. 8, the word "wholesale" is omitted.

Why was that?—Simply because there was no room.

It is disconform to the order you got from Mr. Gray?—Yes.

You did that on your own responsibility?—Yes, as we generally do in such cases. We printed a thousand seals like the one on the cork, No. 8.

And did not Mr. Gray complain about the matter?—Yes, and there were no more done.

He ordered you to stop the printing, and there were only a thousand printed?—Yes.

He complained of the word "wholesale" having been omitted, against his instructions?—Yes.

Re-examined: Mr. Gray made the complaint about six weeks ago.

The Sheriff: Then is the word "wholesale" upon all the others that were printed?—Yes.

John Smith, sworn and examined by Mr. Shaw: I am foreman printer to Mould and Tod. About the month of October or November last I remember Mr. Andrew W. Gray calling at Messrs. Mould and Tod's office regarding an estimate for the printing of price lists (shown No. 3). That is a copy of the price list that we ultimately furnished to the Leith Depôt, Limited, on Mr. Gray's order. In all we printed 15,000 copies. We

furnished the first 5000 about the 14th of May, and the balance at various dates after that.

Just as soon as you could throw them off?—Yes. There was perhaps an interval of about a fortnight between our supplying the first 5000 and furnishing the remainder.

You had 5000 out of hand almost at once?—Well, within three weeks. I had some interviews with Mr. Gray regarding the issue of these price lists and the order for them.

The Sheriff: They were all supplied between December 1 and May 17?—I could not be positive as to the last date, but a great many were supplied between those dates.

Counsel for the complainer put in documents and closed his evidence.

Respondents' Evidence.

Wharton Thomson, one of the respondents, sworn and examined by Mr. Orr?—I am 25 years of age.

The Sheriff: Is it competent for the respondents in such a case as this to be examined?

Mr. Orr: It is a civil action for recovery of a penalty.

The Sheriff: It is a penal statute, but I shall allow the respondents to be examined if there is no objection taken on the other side.

Mr. Shaw: We take no objection.

The examination of the witness was then proceeded with:—I live at 51, Montgomery Street, Leith Walk. I am at present in the employment of the respondents. I served my apprenticeship at Skipton, York. I was four years there. I was then in the service of Joseph Morville, who kept a mixed store, including drugs and drysaltery. I then went to Leeds where I managed a drug store for about two years. After that I entered the employment of Messrs. William Inman and Co., in Edinburgh. I went into the service of the Leith Depôt, Limited, a little over two months ago. I am employed in the Leith Walk shop. I attend behind the counter.

Did you get instructions from Mr. Gray as to dispensing poisons when you entered his employment?—Yes.

What instructions did you receive?—That I had nothing whatever to do with the dispensing department or the sale of poisons. It was Mr. Andrew W. Gray who gave me those instructions.

Did you get any instructions as to what you were to do with prescriptions that were brought in by people?—Yes; I was to take them to the dispensing department.

Were there any qualified chemists employed in the Leith Walk shop at that time?—Yes.

Who were they?—Mr. Nicholas Dodds.

Was he the only one there when you entered the employment?—There was another, but he has left. He went away a few days after I entered the service of the Leith Depôt, Limited.

Was there another qualified chemist employed in his place?—Yes; Mr. Bainbridge.

Do you know where he came from?—Some place in the South.

Was it Stockton-on-Tees?—I could not say so. He is still in the service of the Leith Depôt, Limited, at the Leith Walk shop.

So that there have always been two qualified men since you entered?—Yes. I have never made up a prescription since I entered the employment of the respondents.

Tell me the arrangement of the Leith Walk shop?—There is a dispensing department behind. It is apart from the shop altogether, there being no connection between the two.

Is it at the far end from the door?—You have to go through another door to get to the dispensary.

It is separated from the shop by a door?—Yes, and a small passage.

You have to pass through this door and small passage to get into the dispensary?—Yes.

The Sheriff: Has it always been that way?—Since I entered.

Examination continued: Is it in this place that the dispensers work?—Yes.

Where and how is the laudanum kept?—In the dispensary. There is no laudanum bottle at all kept in the front shop at present that I am aware of. The laudanum is kept in a large bottle.

That bottle stands in the dispensing department?—We manufacture laudanum and send it to the dispensary.

It is manufactured by yourselves and sold out of the dispensary?—Yes.

It is kept there?—Yes.

The business carried on by the Leith Depôt, Limited, is a wholesale business as well as a retail dispensing business?—Yes. They are wholesale and manufacturing chemists. The laudanum and all preparations used for dispensing are made by ourselves. We manufacture chemical food. We supply retailers in different parts of the country, both in England and Scotland.

That wholesale trade has been carried on since you went, and still is?—Yes.

Then in addition to the wholesale and manufacturing trade there is a retail dispensing department?—Yes. The word "wholesale" appears on the sign over the door of the Leith Walk shop. It is also upon the glass door.

You were said to have sold a packet containing oxalic acid on May 18, 1887; how is the oxalic acid made up?—We have a stock drawer in the front shop, and qualified men make up the oxalic acid into packets. It is kept in packets; there is an ordinary chemists' drawer labelled "oxalic acid," and there is a large quantity of oxalic acid kept in that way (shown No. 6). Packets are made up of that size. That is a penny packet. The oxalic acid has been made up into such penny packets since I went there.

The rule is to have it made up ready to supply customers coming in?—Yes. A large quantity of oxalic acid is sold. It is used for cleaning purposes.

And is it asked for by women and children and all sorts of people?—Yes.

Is it within your knowledge that it is commonly sold by drysalters and grocers, and so on?—So far as my experience goes it is sold by almost any one, being such a common article.

With reference to the alleged sale on May 18, have you any particular recollection of the lad Coats coming into the shop?—Not the very slightest.

What would you do according to your usual practice?—I would go to the drawer to see if there were any made up packets of oxalic acid, and if there were any such I would hand over one to the person asking for it. The rule of the shop is that these penny packets are made up by a qualified dispenser.

The dispensers make them up in the dispensary and then put them into the drawer?—Yes.

And that would apply to the stock which you had at that time in May?—So far as my knowledge goes.

When your stock of packets has run out, another supply is laid in?—It is my duty to see that the drawer is kept stocked.

Suppose a person to be standing outside the glass door of the shop, would it be possible for him to see the dispenser in the dispensary department?—It is possible, but the party would have to be standing in a certain position. There is only one position in which he could see him.

I am referring to a party standing outside in the street; would it be possible for him to see the dispenser in the dispensary?—I would hardly think it was possible. I have not tried it; but so far as I can judge, I could hardly distinguish any one in the dispensary, unless I was in a particular position.

Is it a rule that always one or other of the two dispensers is in the shop?—Always. That rule has been attended to in every instance.

In the course of business have you ever seen the two dispensers away at the same time?—No, there is always a qualified man, and sometimes two.

Do they go out at different times to their meals?—Always at separate times. When prescriptions are brought into the shop, I take them to the dispensary and give instructions on the subject, and then after being made up the dispensers bring them forward.

Is the manufacturing business a somewhat extensive one?—Pretty extensive at present. We manufacture laudanum, Parrish's chemical food, tinctures and other things used in dispensing. We do a considerable wholesale business.

Cross-examined by Mr. Shaw: By wholesale business, you mean selling to retailers?—Decidedly not.

What do you mean?—Selling to people in the trade to sell over again.

That is to say, to retailers?—Retailers as a rule do not sell over again.

Do you not sell to retailers?—We retail goods over the counter.

That is not a wholesale business?—No.

Can you tell whether they deal with a single retail dealer in the city of Edinburgh?—Yes.

Tell us one retail chemist or dealer in the city of Edinburgh with whom you deal?—We supply Long and Barker.

They are not retail chemists; tell me one single retail chemist that you deal with?—We do not sell to retail chemists about Edinburgh or Leith.

How long have you been at the trade altogether?—Nine years, so far as I can recollect.

Before being with the Depôt you were with Inman and Co.; are they registered chemists under the Act?—They are like the Depôt—they have a general store.

You know quite well they are not registered chemists under the Act. You know that they do not call themselves chemists?—They call themselves druggists.

When did that take place?—When I was with them. I am not aware of any member of that firm being a licensed chemist or druggist under the statute. I was with Taylor and Co., of Leeds. They styled themselves wholesale chemists and druggists. I am not aware of any member of that firm who was a registered chemist or druggist or pharmaceutical chemist while I was there. At Skipton I served my apprenticeship with Mr. Joseph Morville, who kept a general store. He was not a registered chemist under the Act.

So that you have never been in the service of any person who was a registered chemist or druggist under the Act?—No, never.

Do you intend to be a druggist?—No.

And accordingly you have not attempted to pass the examinations?—No.

You have never gone in for the Preliminary examination?—No.

When Mr. Gray told you that you were to have nothing to do with dispensing or the sale of medicines, do I understand you to have had nothing to do with them, or have you sold poisons?—I have sold them over from a qualified man, just as any apprentice would do.

Have you sold poisons?—Yes.

And I understand you to say that it is your regular practice to sell poisons?—Certainly not; I cannot get at them to sell them.

Do you not consider oxalic acid a poison?—It is a poison.

You can get at that?—Yes.

Is it not your regular practice to sell that?—No.

When are the occasions on which you have sold it?—Very rare indeed.

Do you sell poisons rarely or frequently?—I sell them rarely at the Depôt.

So that when my friend put it that oxalic acid is frequently sold by you, that is not the case?—Not by me.

The reason for that is that it is not permissible for you to sell it?—Certainly not.

Therefore in this particular case of selling oxalic acid you were not acting in accordance with your custom?—Not at all, I have no custom of selling poison except from qualified men, and that rarely.

You talk of the supervision of qualified men; I fancy all the supervision in this particular instance was that you understood they had made it up into packets?—No. That is the only poison I could possibly sell because I cannot get at the rest.

All the supervision that you speak of I understand to be that you understood the packets were made up by the dispensers?—Decidedly.

Whether that were so you were not of your own knowledge aware?—No; but there were none but qualified men employed.

You made the conclusion in that way?—Yes.

You said that oxalic acid is sold by almost any one; is that so?—Yes; to my knowledge it is.

Do you think that right; is it a correct practice in your view of your profession?—It is not according to law.

Re-examined: I understood you to say that oxalic acid is made up in packets in the dispensary?—Yes.

And in the dispensary there are none employed except qualified men?—Yes.

That is to say Mr. Dodds and Mr. Bainbridge?—Yes.

That you know of your own knowledge?—Yes.

You also know that the packets are made up in the dispensary?—Yes.

And are supplied to you by the dispensers?—Yes.

And then when people come into the shop and ask for a pennyworth of oxalic acid, I suppose if you were at the counter you would give them one of those packets?—Yes.

Do you consider that, in selling oxalic acid in that way, you are selling it under the supervision of a qualified man?—Yes. The poison would come to me from the hands of the dispensers. I know the place where the cash girl sits at present; it is in a corner of the front shop at a desk. That corner cannot be seen by a person standing outside the door on the street.

It is within your knowledge that the Depôt sends large quantities of chemical food to Manchester and other places in England?—Yes.

I think a large supply was sent to Manchester the other day in casks?—Yes.

Do you know the names of any firms that are supplied by your people either in Edinburgh or elsewhere?—That is not in my department.

You have seen large quantities of chemical food in casks and otherwise frequently leave your place?—Yes; it is a wholesale business.

David Ovens, sworn and examined by Mr. Orr: I am twenty-one years of age. I am at present employed in the shop of the Leith Depôt, Limited, at 49, Leith Walk. I am one of the shareholders of the Leith Depôt. I served my apprenticeship with Mr. Gunn, in Dunse, Berwickshire. He is a pharmaceutical chemist. I finished my apprenticeship in March, 1885, and I remained on as an assistant with Mr. Gunn till June, 1885. After that I obtained a situation in Liverpool with the Liverpool Apothecaries' Company. I was there from shortly after June, 1885, until April, 1886. I then had an illness and had to return to Dunse, where I remained till about the month of June, 1886. Then I was engaged by Mr. Andrew W. Gray, one of the respondents.

Had Mr. Gray commenced business, or had the Leith Depôt commenced business at that time?—No.

What were you engaged to do?—To order goods and to arrange the shop. Mr. Gray told me that it was a wholesale business.

What were you employed to do?—A wholesale and retail trade.

In what?—In drugs and patent medicines. I commenced with Mr. Gray in June, 1886.

With the Leith Depôt at the Leith Walk shop?—Yes We there carried on both a wholesale and retail business. We did not retail poisons at that time,

but we sold patent medicines, and ordinary drugs, other than poisons.

Did you do a trade as manufacturing and wholesale chemists?—Yes. We manufactured chemical food, tinctures, and powders, such as Gregory's mixture, and compound liquorice powders. We manufactured Parrish's chemical food.

You have been carrying on that manufacturing business down to the present time?—Yes; we are still carrying it on. We do a wholesale trade.

What sort of people do you supply in the wholesale way?—Wholesale and retail chemists throughout the country.

Do you mean in Scotland?—In England. We supply retailers.

Can you name any?—I do not think I am inclined to answer that question.

You supply retailers over the country?—In England.

In England and Scotland?—Retailers in England.

You also do a general trade in tea, sponges, and so on?—Yes.

Do you remember that a limited company was formed about November?—Yes.

What was the purpose of that?—To allow us to sell and dispense poisons.

Was a qualified chemist at that time employed by the company?—Yes, Nicholas Dodds. He is with us still.

Later on, I think, you employed a second qualified man?—Yes.

What is the name of the second qualified chemist at present?—Mr. Bainbridge. I think he has been with us for about two months.

Where did he come from?—Oldham.

Do you know if he had been in Stockton-on-Tees?—I am not quite sure, but I think he was there. He belonged to that place. He is still with us.

You had a qualified chemist before, and then he left, and Mr. Bainbridge took his place about two months ago?—Yes.

I think the arrangement of the shop has been changed in regard to the position of the dispensing department?—Yes.

At first, and in December, in what part of the shop was it?—It was at the right hand corner, at the far end of the shop from the door.

Is that where the cash girl is now?—Yes.

Where she has a desk or box?—Yes.

The Sheriff: When was the change made?—At the end of December.

Examination continued: Tell me about this dispensing department before the change was made.—We kept all poisons and tinctures and powders used for dispensing there.

Was it shelved off or separated from the body of the shop?—There was a label case which obstructed the view. The back of the label case looked into the dispensing department, and that formed a screen between it and the shop.

How high was this thing?—It stood about 2 feet above the counter.

And did the dispenser work behind it?—Yes.

You have never tried whether you could see a man in this dispensary from the outside door?—I think it was quite impossible.

It is not in the line of view?—No.

A change was made in the position of the dispensing department at the end of the year?—Yes.

How is it now situated?—It is in the back room, at the back of the shop. You enter through a door.

In December what was the staff employed?—Mr. Dodds, Mr. Gray, myself and two message boys, about the beginning of December.

What is the staff employed now, or what was it in May last?—In the Leith Walk shop, we have Mr. Dodds and Mr. Bainbridge—two qualified men, Mr. Thomson, Mr. Gray, another man and myself. There is a message boy and cash girl also in the shop.

You are said to have sold some laudanum in December last to a lad named Coats; have you any distinct recollection of any such sale?—No.

Was the laudanum bottle in the dispensing department in the corner?—Yes.

What was your custom in supplying laudanum when asked?—Either to allow the dispenser to sell it, or to sell it under his supervision.

You mean to go back to where the bottle was, and fill it up there under his eye?—Yes.

Was it the rule that the dispenser, while there was one, and since you have had two, that one or other of them should always be on the premises?—Yes.

And if poisons were asked for when one dispenser was away at his meals, what was the rule: the two did not go to their meals at the same time?—No.

But when you had one, and before you got a second, what was the rule?—I expect the poisons would be sold exactly as in a chemist's shop when the master is out.

Do you mean the assistant would take it upon himself?—Yes.

Can you say whether it was the custom to wait until the qualified man returned?—Something of that kind. After December there were none but qualified men to sell poisons. That was after Center's case.

What were Mr. Gray's instructions to you as to the sale of poisons?—That when anybody asked for poison the bottle was to be handed to the dispensers from the front counter, and after being filled in the dispenser's department it was to be given to the customer.

Was that rule always observed?—Yes; always.

The Sheriff: When did you get these instructions?—I do not remember exactly; it was some time in December.

Examination continued: What has been your practice as to the keeping of oxalic acid and the selling of it?—Qualified men put it up into packets, and these are put into a drawer in the shop to sell.

They are kept in a drawer in the shop, after having been made up by a qualified man in the dispensary?—Yes.

You know that of your own knowledge?—Yes.

Cross-examined by Mr. Shaw: I am not a pharmaceutical chemist, or a chemist or druggist under the Act.

I believe that after, or in the course of your apprenticeship in Dunse, you appeared for the Preliminary examination?—Yes.

In 1884?—About that time.

You failed to pass?—Yes.

And then in Liverpool again, in January, 1886, you appeared for examination, but unfortunately you again failed?—Yes.

And have you ever appeared for examinination since?—No.

Was it shortly after failing to pass your Preliminary examination that you were engaged by Mr. Gray to order goods, and arrange the goods in the shop?—It was a few months after that.

It was contemplated from the beginning, I understand, that the business should be wholesale and retail?—Yes.

And it has been conducted as such since?—Yes.

Under whose management is that business? Who could be called manager there?—Mr. Andrew W. Gray.

I call your attention to No. 3—a price list—in which there is the statement—"The new depôt is under the management of a thoroughly qualified pharmaceutical chemist of great and varied experience." Who does that refer to?—Mr. Forwell.

Do you mean to say that the new depôt is under Mr. Forwell's management?—Yes; the depôt at 33, Ferry Road.

It is entirely under his management?—Yes; he is the manager.

And Mr. Gray at Leith Walk?—Yes.

Mr. Gray is not a pharmaceutical chemist?—No.

And is this Mr. Forwell the person who is referred to as having great and varied experience in England, Ireland, and Scotland, late dispenser at the Army and Navy Stores?—Yes.

Is he a pharmaceutical chemist?—Yes; of Ireland.

Is that something different?—Yes.

When did you start the retailing of poisons?—At the time of the forming of the company; it was in November.

And have you retailed poisons in the place ever since?—No poisons sold but by qualified men.

There have been poisons sold retail?—Yes.

I think you also said that the purpose of the incorporation of the company was to allow you to sell and dispense poisons?—Yes.

Did you ever try to see whether any one could see into the back premises from the outside?—No.

You never made the experiment?—No.

How was that back place formerly lighted?—There was gas for lighting it at night.

And during the day?—The ordinary light that comes into the shop.

From the front?—Yes.

Then there must have been either no division or a glass division?—There was a division at the back two feet high over the counter.

But whether any person could be seen over that division, you have not made the experiment?—It would take a very tall person to see over it.

On December 15 who was the qualified chemist, or who were the qualified chemists?—Mr. Dodds; just the one.

And was it just applicable to that period that your remarks as to the practice that went on when Mr. Dodds was away, applied—that poisons would just be sold in the ordinary way, although he was away; it was just in December that was done?—Some time in December.

You heard the evidence that was given by Mr. Hill and by the lad Coats as to the purchase of laudanum?—Yes.

Do you say that that evidence is untrue?—I do not think it is true.

You will not take it upon you to say that it is untrue?—No, I could not say that.

Selling laudanum is quite a common thing in your premises?—Yes.

And a bottle of it would be pretty handy?—I do not understand.

It would be pretty handy to you when it is so frequently sold?—Yes.

Was there not laudanum in the front shop?—Yes; in the dispensary in the front shop.

Is there any difficulty in seeing the dispensary in the front shop?—You could see the top shelves, but not the bottom shelves.

You had not far to go for the laudanum bottle?—It is in the dispensary.

That was just in the front shop?—Yes. The counter is, I think, about ten feet in length.

How many feet would you have to go for the laudanum?—About six feet.

You had just two paces to go and you would get the laudanum?—I think so.

I think you made a remark to the effect that there was some change in your practice after Center's case?—Yes.

What was the change?—Mr. Gray gave an order that none but qualified men should sell poisons.

Are you not aware that Center's case was on the 18th of February last?—No. I thought it was in December.

May it have been in February?—Yes; it may have been.

And it was not till after that that you got strict orders?—We got strict orders at that time.

Re-examined: The Preliminary examination you were asked about is an examination in general knowledge?—Yes.

It is not an examination dealing with special subjects, such as chemistry and the like?—No.

Are the names of your drugs all in the Latin language?—Yes.

And do you know sufficient Latin to enable you to read these names?—Yes.

You have been working among them for a number of years?—Yes; for seven years.

And I suppose you had experience of this kind of work when you were with Mr. Gunn?—Yes; I managed the shop for a week when I was an apprentice. I was five years with him.

The Sheriff: And you sold poisons for him?—Yes.

In his absence?—Yes.

Mr. Orr: Would it be true to say that when you were asked by Coats to supply him with some laudanum, the bottle was at your side or at your back?—No; it was two or three paces away, in the left-hand corner.

You would have to take a pace or two and pass in behind the front part of the dispensary?—Yes.

And the corner where the dispensary was, was on the other side of the shop from the counter?—Yes.

So that you had to cross the shop and go to the opposite corner?—Yes.

Your practice and rule, I understand, at that time, and all along, was, that a qualified dispenser dispensed poisons?—Yes.

I think, after the case mentioned, you got strict instructions again about the matter?—Yes.

But that had been your practice from the beginning?—Yes.

You are satisfied from the position that this dispensary occupied, that a person outside the glass door could not see into it?—Yes.

Henry Forwell, sworn and examined by Mr. Orr: You are a registered chemist and druggist of the Pharmaceutical Society of Great Britain?—Yes.

You are also a pharmaceutical chemist of the Pharmaceutical Society of Ireland?—I am.

You are at present in the service of the Leith Depôt, Limited?—Yes. I am manager of the Ferry Road shop. I have been in the drug business for about twenty-two years. I have been employed in England and Scotland. I was in the Army and Navy Stores, London.

In the price list issued by the respondents (No. 3) there is a statement to the effect that the new depôt (the Ferry Road shop) is under the management of a thoroughly qualified pharmaceutical chemist of great and varied experience, etc.; that refers to you?—Yes; it is a correct description of my qualifications.

You have had great and varied experience in England, Scotland and Ireland?—Yes. I am a chemist and druggist of Great Britain, and a pharmaceutical chemist of Ireland.

You are a pharmaceutical chemist?—Yes. I entered the service of the Leith Depôt, Limited, when they opened their branch at Ferry Road. I live at 101, Ferry Road, which is about two minutes' walk from the shop.

Do you dispense prescriptions?—Yes; all the prescriptions are dispensed under my supervision. I, perhaps, do not do it myself, but it is done under my care.

If it is not done by your own hand, it is done under your eye and supervision?—Yes.

I think you live so near the shop in order to be as little out of the shop as possible?—Yes; I am very little out of the shop.

When prescriptions come in while you are away at your meals, what is done with them?—If they contain any poison they are kept till I come back.

When a prescription is made up under your supervision you check the quantities?—I check all the poisons. I have had a qualified man along with me in the Ferry Road shop from the beginning.

I think he left some time ago and you have been advertising for a successor?—Yes.

What was his name?—Mr. Halley. We are on the outlook for another one just now. Mr. Halley left about six weeks or two months ago. The sign above the door of the Ferry Road shop is "The Leith Depôt, Limited, wholesale chemists and druggists, tea merchants and sponge importers."

Cross-examination by Mr. Shaw: You are retail chemists and druggists at Ferry Road too?—I would not say that we are retail—wholesale principally.

You do not retail anything?—It all depends on how you put it.

Do you give evidence to the effect that you do not deal as retail dealers in Ferry Road?—I would like a definition of that. We are wholesale dealers.

Do not you sell poisons just as any ordinary chemist who is not a wholesale poison dealer?—No.

Is it not the fact that you sell small quantities of laudanum there, for instance?—Well?

Is that wholesale?—We do it wholesale.

Is a small quantity like a pennyworth wholesale?—Yes. We sell such small quantities.

You sell pennyworths of oxalic acid to people to do their washing with?—Yes.

Do you call that wholesale, too?—Well, it is a wholesale order.

You are quite serious in giving these answers?—Yes.

So that if you sell a halfpennyworth or a pennyworth of poison to anybody in the ordinary course, you consider it wholesale?—We consider it wholesale; we sell at wholesale prices. The paper now shown me applies to the Leith Walk business. At the bottom there are the words "Goods retailed at wholesale prices."

Is that what you do in the Ferry Road shop?—That does not say poisons.

Do you retail goods at wholesale prices?—Yes.

Do you sell poisons at wholesale prices?—Yes, everything.

You retail poisons at wholesale prices?—Yes.

Would you allow oxalic acid to be sold if you did not see the sale?—No.

You would think that that was contrary to the Act and to your instructions?—Yes, I do not allow it.

You do not allow it to be sold unless you are present?—Yes. I give it out myself, or I would give it to an assistant to make up on the spot.

And that is in accordance with the regular practice?—Yes.

Whose employment were you in when you entered that of the Leith Depôt?—I was not in any employment.

How long had you been out of employment before that? About a week.

In whose employment had you been before that?—Mr. Inman's.

What happened when you left him?—That has nothing to do with this matter at all.

You left?—Yes.

Suddenly?—Well?

How long were you with Inman?—Four months. His stores are in Leith Street, Edinburgh.

Were you out of employment before you entered the service of Inman and Co.?—No, I came to him from the Army and Navy Stores.

Why did you leave them?—Because Mr. Inman engaged me.

Did you not leave them on account of being dismissed?—No.

What was the cause of your leaving the "Army and Navy?"—Because I wanted to get back to Scotland.

You have been in business yourself?—Yes, I was in Helensburgh for about six years. I then went into service in Dublin, and was there for three years.

Were you out of employment after that?—Not much.

For how long?—About a month, and then I went over to London.

To look for something to do, and you succeeded in getting a place in the "Army and Navy?"—Yes. If I had known you were to be so very doubtful, I would have brought up my testimonials with me.

Re-examined: In selling oxalic acid, I suppose you have qualified men who make it up in packets?—Yes.

It is made up in penny packets?—Yes. These are made up, labelled, and handed over to whoever is at the counter.

If you make up the packet yourself, you are satisfied, and it can be sold by the hand of a non-qualified person at the counter?—Yes.

All that he does is simply to pass it from the one hand to the other?—Yes.

Or if he takes it out of a drawer it is the same thing, if it is made up by yourself?—Yes.

Nicholas Dodds, sworn and examined by Mr. Orr: I am a registered chemist. I am at present in the employ of the respondents, the Leith Depôt, Limited. I started the business of a chemist in Coldstream in 1863.

I think you and your brother were in partnership for some time?—My brother was in Kelso. I was with Messrs. Raubine and Co., Kilmarnock, and I was for some time in the Professional and Civil Service Stores in Edinburgh.

When did you enter the service of the Leith Depôt?—I think in the beginning of November, but I am not sure of the day. I have been with them all along in the Leith Walk shop, except being half an hour or so occasionally in the shop at 33, Ferry Road, to relieve someone there. Practically I have been in the Leith Walk shop all the time.

What was the arrangement as to work, between you and Mr. Gray? What were you to do?—To dispense prescriptions, and attend to the front shop.

Dispense poisons?—Yes, and prescriptions of all kinds.

Were you engaged for that purpose?—I was engaged as dispenser.

I think you were sole dispenser for some time, and then a second man was engaged?—Yes. The second man at present employed is Mr. Bainbridge.

In December last, I think, your dispensary was in the left hand corner of the shop, but it has been altered since?—Yes; it is now in the right hand corner, as you enter the shop. The change took place within the last two or three months. You now pass through the shop to get into the dispensing department. The cash girl has a desk at the place where the dispensing was done before. Before the change was made, the laudanum was always kept beside myself in the dispensing department, and now it is kept nowhere else but in the back where the dispensary is at present.

What was the practice when laudanum was asked for by a customer?—The order given by Mr. Gray to me was that all poisons were to be dispensed by myself.

Was this when you entered his service?—Yes.

Was that rule followed?—As far as I know, it has been adhered to, and since the transference of the dispensing department to the back the order was repeated—that all poisons were to be dispensed by qualified men.

Then if a person came in asking laudanum, what would the person at the counter do?—If it was not myself or the other qualified man, the person at the counter would bring the bottle to me, and I would make up the quantity required, and hand the bottle to the man, or to the customer.

If the lad himself did it, it would be under your eye and supervision?—It must have been under my eye or that of my neighbour, the other qualified man.

And that has been the rule and practice throughout since you went?—Yes.

What about the oxalic acid; I think it was kept in penny packets?—Dozens of packets of all sorts of medicines for sale.

Oxalic acid among others?—Yes.

Who made up those packets?—Made up by myself.

Or, I suppose, by the other qualified man?—I do not know. I know that he has made up many packets at the back beside myself.

They were made up at the back?—As a rule. I cannot say as to oxalic acid, but there were a lot of other penny packets. It was the practice of the shop to dispense at the back.

And that applies to oxalic acid as well as to other poisons?—It applies to all poisons.

Then I suppose the lad would take a packet out of the drawer if it was asked for?—The man at the counter would take it out and hand it over. The other preparations are in the dispensary altogether, and could not be got without applying either to the other qualified man or myself.

I think your people are manufacturing chemists?—Yes; they manufacture chemical foods and other things to a great extent.

And send them away in wholesale quantities?—Yes, hundredweights at a time.

To retail dealers in London and Manchester?—Yes.

Do you manufacture laudanum?—I manufacture it myself at Leith Walk.

And is that sent away also?—I have never seen a wholesale order given for laudanum at all.

What things are sent away wholesale?—Chemical food is the principal thing wholesale, and we also send sauces out wholesale.

Cross-examined by Mr. Shaw: A retail chemist manufactures laudanum for his own shop?—As a rule, especially in country places.

I think you said you could not speak particularly to oxalic acid?—I cannot speak particularly to the party handing it over the counter. Lots of penny packets of all kinds are made up at the other shop and sent across to us.

Would they include oxalic acid?—I cannot say for certain.

You would have to go out of the shop occasionally for your meals?—Yes, dinner time and tea time. There is always a qualified man left in the shop when I get out that way.

In December there was no other?—Not except myself.

What happened when you were away?—The order was that no poisons were to be dispensed when I was away.

You cannot say whether that order was adhered to?—No.

I do not suppose you would be surprised to hear that when you were out one day in December, your assistant took a pennyworth of laudanum from the big bottle and sold it?—I would not be surprised, but at the same time I know the order was against it.

Where were you before you entered the Leith Depôt?—I was with Mr. McFarlane, at Abbeyhill. I was there for some time.

Re-examined: Were you told on any occasion, or did you hear when you came back from your meal, or when you had been out otherwise, that laudanum had been supplied in your absence?—I never heard that anything of that kind had been sold.

You know that the custom was to carry on business as you have said?—Yes, always.

Counsel for the respondents closed their evidence.

Friday, July 1.

Arguments of Counsel.

Mr. Shaw: My Lord, I attend, as your Lordship is aware, for the prosecutor in this case, and I propose to address to your Lordship briefly a few observations upon each of the charges which still remain for consideration. The first charge is that with reference to using, exhibiting, or putting up the title "chemists and druggists" in connection with the two shops mentioned. Now, I submit shortly that that charge is proved. It is proved by the evidence of Hill, by the evidence of Coats and by several of the respondents' witnesses, particularly the witness Ovens, who gave your Lordship details of what was above the door. Now, it is unquestionable, with regard to the signs above each of the doors, that the words "chemists and druggists" occur there. I shall deal with the defence afterwards which is founded on the word "wholesale;" but at present all that I am content to urge is that the words "chemists and druggists" are there in legible letters, sufficient to attract a patronizing public. The defence to the second charge and to the first I shall deal with together; the second charge is issuing circulars, labels, and advertisements to the public. The witness, D. R. Thomson, proves the advertisement in the *Leith Parish Magazine* for May; and the witnesss Gardner proves the advertisement in the *Leith Burghs Pilot* for April 9 and succeeding dates. Gardner also proves the issue, on the order of the Leith Depôt, Limited, of no fewer than 10,000 circulars in the month of February containing the words "chemists and druggists." The witness Hope proves the advertisement in the paper called the *Leith Herald*, on May 7. The witness Paton proves several things—the issue of the seals for the corks to the extent of several thousands. They also contained the words "chemists and druggists," the small seal containing the word "chemists" only. Paton also proves that the prescription envelopes and the seidlitz powder envelopes both contain the words "chemists and druggists," which constitute the offence, and that these prescription and other envelopes were furnished to the respondents here to the extent of 10,000 copies. The witness Smith proves one of the most important documents in the case to have been ordered by the respondents, viz., elaborate price lists, 5000 at least of which were furnished before the 17th of May. In the early pages of that list there is everything done by way of advertising the business of chemists and druggists to be carried on in the premises of the Leith Depôt at both the addresses mentioned in the indictment. Now, my Lord, the defence, as I understand—if one could trace it from the evidence led—was that this was not the ordinary business of chemists and druggists, but that the word "wholesale" was appended, and that in that way the statute was avoided. Now I should call your Lordship's attention to the fact that the business which is truly carried on is represented in the memorandum of association of this company—and quite truly represented—to be that of wholesale and retail chemists and druggists, and it is according to the evidence of the respondents' own witnesses that a business in accordance with that specification in the memoranda has been all the time carried on. The true explanation, I have no doubt, is that contained on the front of one of the labels which was founded on for the prosecution, and it is to this effect that goods are retailed at wholesale prices. It is for that object, and for that object alone, that the word "wholesale" has been so prominently introduced into the advertisements and signs of the Leith Depôt, Limited, in order that by that means they may more successfully attract ordinary customers who deal with them. That is the meaning of the use of the word "wholesale," and nothing else.

The Sheriff: Mr. Forwell seemed to think the sale of a pennyworth was wholesale.

Mr. Orr: They got a bigger pennyworth, I suppose.

Mr. Shaw: Your Lordship will, of course, keep in view what are the transactions in question. Not a single transaction which is proved here in detail—and I think with reference to this your Lordship is entitled to look to the subsequent parts of the evidence as to the sale of poison—not a single transaction has been proved to have been a wholesale transaction. The evidence ultimately came to this in the mouth of Mr. Forwell, that he considered it a wholesale transaction if he sold a pennyworth or a halfpennyworth of any article. But I look at the statute to see whether there

is any warrant for the distinction which is set up, and I find the only suggestion or warrant to be contained in sections 16 and 17 of the Act of 1868. Section 16 is to the effect that nothing hereinbefore contained shall extend to or interfere with the business of any legally qualified person, etc., "nor with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing." I am in your Lordship's judgment whether any of the transactions which are cut at here are transactions of supplying poisons in the ordinary course of wholesale dealing. There is no liberty to a person to deal in drugs wholesale at all. It is only said that the person who shall sell drugs or poisons is not to be interfered with if he sells poisons wholesale in the ordinary course of wholesale dealing. Section 17 also deals with the matter of it being unlawful to sell anything except with certain qualifications. Your Lordship will find that it was not to apply to articles to be exported from Great Britain by wholesale dealers, nor sales by wholesale dealers to retail dealers, in the ordinary course of wholesale dealing. Now, the question arises whether the respondents have proved that in this case they are entitled to use the sign "wholesale dealers" simply because they did manufacture certain medicines. It is proved by their own witnesses that the manufacture of laudanum and other medicines is a manufacture conducted by all retail dealers.

The Sheriff: Section 17 applies to poisons only.

Mr. Shaw: Poisons only, in the first half of the schedule, and applies, I take it, to the labelling of them.

The Sheriff: It sets forth that the provisions of this section, which are solely applicable to poisons in the first part of the schedule, shall not apply to articles exported.

Mr. Shaw: Now, I do not propose to interfere with the business of wholesale dealers supplying poisons in the ordinary course of wholesale dealing, but I take my stand upon this, that in this instance I have proved that there is retail dealing, and there is coupled with that the use of the words "chemists and druggists." Now, the next part of the proof upon those two charges is that none of the persons composing this Society or limited company are registered. Under section 13 of the Act of 1868, the evidence which was given by the Registrar is sufficient to that effect. The justification upon that part of it is that this limited company apparently has started under the auspices of some one who knew the whole matter very well, and that person was Mr. Ovens. That is no justification; but if we are driven to investigate the facts upon that matter, your Lordship will not fail to remember what is Ovens's history. In the year 1884 he failed to pass the preliminary examination of a chemist and druggist, and he repeats the experiment in 1886 with the like disastrous result. Shortly after he has failed, for the second time, to pass an examination preliminary and necessary for all persons in this profession, he is engaged forsooth by this limited company to assume the management and direction, at least in its initiatory stages, of this apparently pretty extensive business, which includes retail dealing to a large extent. The observation which I would make upon that is that your Lordship will not fail to remember that it has been spoken to in evidence over and over again that the prescription labels and the rest of that kind of furniture of the business is a kind of stock which is used solely by retail dealers. No wholesale dealer would provide 10,000 prescription labels, because he does not deal in prescriptions; he does not dispense. He supplies presumably by the pound or the hundredweight or ton; but no wholesale dealer goes into trade having 10,000 prescription labels and having dispensing departments in retail shops. That applies also to the other envelopes; and your Lordship will bear in mind further that the price list in question is a price list containing various intimations not for a wholesale dealer at all, but containing such attractions as appertain to the dispensing and retail departments. These are my observations upon the first two parts of this indictment. I hold that we have conclusively proved our case upon these matters, and I turn now to the fifth charge. Now, that is the case of a sale of laudanum by Ovens on the 15th of December. That sale is proved by Hill and Coats.

The Sheriff: Before you go on to that—do you maintain that all the respondents are equally liable under the first two charges?

Mr. Shaw: Yes, I do, because the name used in connection with the words "chemists and druggists" was the name applicable to the Leith Depôt, of which they were the sole partners. The profits arising from the use of that name were profits which fell to be divided according to the holding of the various partners of the Company.

The Sheriff: Then do you ask them all to be found liable in the statutory penalty?

Mr. Shaw: Yes, each one of them. If your Lordship were forced to make a selection, I should take Mr Gray.

The Sheriff: That was rather what I was pointing at. I do not say in the meantime what I will do, but I wanted to know what you had to say on that point. Mr. Gray, according to the evidence, I think, was the managing partner or held the position of managing director, because the evidence was that these advertisements, circulars and other things, were all done by his orders. The other shareholders were getting the advantage of that, no doubt.

Mr. Shaw: Your Lordship will keep in view that Ovens is a partner, and it was under his supervision that the thing was started.

The Sheriff: What shares had Ovens?

Mr. Shaw: A few shares.

The Sheriff: Gray had forty-three shares.

Mr. Orr: Ovens had three.

Mr. Shaw: Ovens calls himself assistant chemist, and it is Ovens and Gray who do the whole thing.

Mr. Orr: And Dodds, who is a qualified man.

Mr. Shaw: Dodds is not a shareholder. I am talking now of the shareholders. No doubt Ovens is equally guilty with Gray in this way, that he is in the shop.

The Sheriff: He is taking an active part in the business.

Mr. Shaw: And he is a shareholder of the Company. Gray and Ovens seem to be the parties who have the matter most directly brought home to them.

The Sheriff: Ovens seems to have been acting as a servant.

Mr. Shaw: But he is also justly entitled to his share of the profits.

Mr. Orr: Three shares.

Mr. Shaw: In fact, if Ovens had been qualified, it would have been upon that that the defence would have been founded. He has the nearest apparent qualification of any kind or description; and it is under his advice—he having been seven years at the business—that the thing is started. The fifth charge is that as to the sale of laudanum by Ovens on December 15. That is proved by Hill and by Coats. Ovens is put into the box, and it is put to him plainly, "Can you say that the evidence of Hill and Coats is not true?" and he cannot.

The Sheriff: He has no recollection of the transaction. He says he may have sold.

Mr. Shaw: Yes. Now, what is the defence upon this part of the case? It has been proved that Ovens has no qualification. Apparently the defence is twofold. In the first place, it is that there is a dispensing department out of which the laudanum is always got. With regard to that matter, your Lordship will keep in view that the dispensing department was in the front shop at the period in question, or at least part of it. All that Ovens had to do to go to what he calls the dispensing department was to step two paces. Now, is it likely that

Ovens, with seven years' experience, would require to go to some qualified man to consult him as to whether he would give out a pennyworth of laudanum? I think the likelihood is that Mr. Ovens knew quite well about laudanum, according to his own opinion, and has dispensed laudanum, not once, but a thousand times in that shop without consultation with anybody. But then we must have regard to the sworn testimony of Hill and Coats in this matter. They see with their eyes what is done. Ovens takes a step, or, it may be, two steps aside, and takes the bottle without consultation with any human being, puts a pennyworth of laudanum into the little bottle, and there is an end of it. Ovens would not undertake to say that that was not a true statement. Your Lordship will judge whether Hill and Coats would tell that story without its being absolutely true. But then it is said, "Oh! well, there was a dispensing department also in the back shop." The dispensing department seems to have been altered to a certain extent after December; it is not proved to have been altered before. Now, apparently, his case is that no one looking through the glass-door could see any person in the back department.

Mr. Orr: No, that was not the case; he could not see him in the original dispensing department.

Mr. Shaw: I say that I have nothing to do with that back dispensing department. Mr. Hill saw the whole premises and saw nobody there. There is not one witness for the defence who can be got to say that he tried the experiment, not even Dodds; he never looked to see whether that dispensing department was visible or not.

The Sheriff: If the thing has been altered it would not give an opportunity of testing what could be seen on December 15, but you have two witnesses who certainly do not think so.

Mr. Shaw: I am not driven to say whether that was so or not, because Coats and Hill say that Ovens went to no dispensing department. Then the next point is that the whole transaction was under the supervision of Mr. Dodds. Now, if the evidence of Hill and Coats be true, Mr. Dodds did not supervise this sale at all. But then Mr. Dodds's evidence is to the effect that, in December of last year, when he had to be away at his meals there was no other dispenser left in the shop, and he has no doubt that a good deal has been transacted in his absence, but what that was he cannot say. But this is the very time when Dodds may have been away twice in the day, when we say there was no one else in the premises except the other lad, that the laudanum was purchased. Accordingly I displace the defence to the effect that there was supervision on the part of Dodds, and that there was application to another department. The remaining charge is one against Thomson.

The Sheriff: That is a separate complaint.

Mr. Shaw: Yes, and it relates to probably the most dangerous of all sales—the sale of oxalic acid, by which poison there are more suicides in this country than by any other. That sale took place on May 18. Now, that is proved by the witnesses Hill and Coats, and it is not denied that the sale took place. Now what is Thomson's history in this matter? I have spoken about the career of Ovens. Thomson says that he has no intention of being a druggist at all. He never was with a registered chemist in his life. He has gone from situation to situation, leaving Inman's suddenly, and he never was with a registered chemist under the Act. If I understand the defence, it is something to this effect: "Oh! well the sale of oxalic acid is a very common thing; it is the daily practice." Well, if that be so, the sooner it is put down the better. That may account for certain statistics with regard to this poison, and the sale of it in this way certainly has no defence under the statute. The practice is, in a manner, but only in a manner, defended by Thomson, who says it is quite common for a grocer or other unqualified person to sell it, although he quite admits that that is against the law. I had some difficulty in extracting from Thomson whether he rarely or frequently sold this poison. Apparently, I think, he took up the position that it was a rare transaction, but that he had done it, and that he did it on this occasion. The second defence is that there was supervision here also. Well, the supervision which is alleged is a supervision of this kind, that upon some former occasion, somebody else who was qualified had put up oxalic acid into penny packets, and had sent these holus-bolus into the shop, either from the back shop or elsewhere. Your Lordship will observe that the actual sale libelled is not pretended to have been under supervision at all. The defence resolves into this, that what was sold was something that some other body at some unknown date, and in some unknown circumstance, had made up. The actual sale of the oxalic acid in question was made under the supervision of no human being. Thomson says, "I did not require any supervision, because I trusted it would be all right, being put up and labelled in the way described." If the defence here was to be upheld, you would have the whole of the poisons sent in small quantities from some other store, and all that would be required would be to show that that other store contained a qualified dispenser. Dodds's evidence is to the effect that he cannot speak to the oxalic acid; he says, perhaps it came from the other shop; that is the evidence of Dodds, who dispenses in Leith Walk. Well, if that defence were good, it would simply come to this, that the Act would be altogether evaded, not only in its letter, but in its spirit; because you might have a set of boys in the shop in Leith Walk, not one of whom was qualified, receiving perhaps hundreds of parcels of oxalic acid, seidlitz powders, and so on, and mixing the whole together, or perhaps not sufficiently distinguishing which they would sell, and it would be a defence to the complaint under this statute, that somebody else had made up the oxalic acid, at some unknown time and some other place. You might thus have a retail business under the charge of a number of lads, not one of whom had the necessary qualification. What the statute contemplates is that the actual seller shall be a person qualified. I quite admit that a sale might be made by an assistant, under the control of a qualified person, who prepared and handed the article to the assistant to be given to the purchaser. There is nothing of that kind here, however, and the language of the statute is that any person who shall sell, not being qualified, is liable. Now, the person who sold was Wharton Thomson. He is not qualified, and there was no supervision in the sale. In this case I ask a substantial penalty, for this reason, that the whole business is being attacked by me, although only by single instances. It is perfectly evident that these are instances of very large transactions. The business is apparently carried on to profit, but carried on in a manner which is in defiance of the statute. I do not think it can be said in this case that there is any grasping at a penalty, if I demand simply that the respondents shall conform to what is prescribed by the statute, and that if they have deliberately failed so to conform they shall suffer the penalties which are prescribed. I ask accordingly that the penalties should be awarded, and that the prosecutor should in each case be entitled to costs.

Mr. Orr: It now devolves upon me to address to your Lordship what remarks I have to make on behalf of the respondents in this case. I do not know that my observations need be very prolonged, because your Lordship has the facts of the case quite fresh in your mind. In regard to the first two charges, those, namely against the Company, I think that the judgment which your Lordship pronounced yesterday upon the objections taken to the relevancy goes a certain length, but only a certain length, in disposing of the charges in so far as they affect the Company, because I understand your Lordship's judgment to be that if the Leith Depôt, Limited, call themselves chemists and druggists, then we have here

a good charge as against the individual shareholders, and all that has got to be proved is that the Leith Depôt, Limited, exhibited that title. Of course, I accept that judgment, and I have nothing to say upon that; but that does not, I think, quite exhaust this case. In one view, I am not sorry that the facts have come out, because we now know very clearly the way in which this business is conducted, the kind of title that they exhibit and the whole facts of the case, and I think I may say that my clients have proved themselves to have carried on this business in a perfectly open, honest and honourable manner. The sign above the door does not disclose the name of any one of the shareholders or partners. So far as we know, not one of them holds himself or herself out as a chemist or druggist.

The Sheriff: I assume that.

Mr. Orr: What they do is to hold the Leith Depôt, Limited, out as wholesale chemists and druggists.

The Sheriff: Of which they are the sole partners.

Mr. Orr: They do not hold out that they are, or in any way pretend to be, qualified chemists, but when they proceed to commence the business of dispensing, they announce to their customers and the public generally, that they are going to employ duly qualified chemists, and they say "you may come to our dispensing department with perfect safety to have your prescriptions made up or to buy drugs. You will find that we employ none but qualified men as the law requires." I found specially upon the price list for 1887. In it the respondents call attention to the fact that their business is extending, and that they have opened a second shop, that shop being in Ferry Road, and they refer to the business of the Leith Walk shop, which is now to be conducted under a larger and more efficient staff of fully qualified men in the dispensing and retail departments—that is to say they had one qualified man, but as the business grew they found it necessary to employ more, and, therefore, it is literally true that they employed a large staff of fully qualified men. They go on to say that their new depôt is under the management of a thoroughly qualified pharmaceutical chemist of great and varied experience in England, Scotland, and Ireland, late dispenser at the Army and Navy Stores, Westminster. That is true—every word of it. It refers to Mr. Forwell. Then in regard to the dispensing department——

The Sheriff: Was Mr. Forwell a pharmaceutical chemist?

Mr. Orr: Yes—of Ireland; he qualified there.

The Sheriff: He was a chemist of Great Britain, but was a pharmaceutical chemist of Ireland only.

Mr. Orr: That gave him his title of pharmaceutical chemist. It happened to be in Ireland where he took out his degree.

The Sheriff: He is not on the register as a pharmaceutical chemist; he is only there as a chemist and druggist.

Mr. Orr: I do not know whether there is a separate list kept of pharmaceutical chemists in Ireland.

The Sheriff: The register which is referred to here is the register of persons who have carried on in Great Britain the business of chemist and druggist.

Mr. Orr: I do not know that he has carried it on.

The Sheriff: He had carried it on. It seems that it was in respect of his having carried it on prior to 31st December, 1868, that he was registered as a chemist and druggist of Great Britain; but he is not in this register as a pharmaceutical chemist, and I rather think the register to which the statute of 1868 applies is only the register of Great Britain.

Mr. Orr: There are two registers, both kept by the same official—the Register of Chemists and Druggists and the Register of Pharmaceutical Chemists, kept under the Act of 1852.

The Sheriff: But does the register kept under the Act of 1852 apply to pharmaceutical chemists in Ireland? I do not think so.

Mr. Orr: It may be that there is a separate Act applying to Ireland. There is, I think, some provision that this Act shall not extend to Ireland.

The Sheriff: The fact is that Mr. Forwell was a chemist and druggist duly registered under this Act.

Mr. Orr: Yes.

The Sheriff: And he was also a pharmaceutical chemist of Ireland; there is no evidence to the contrary. You maintain that to be sufficient to answer the description given in the price list?

Mr. Orr: Undoubtedly. And there is a general statement as to the dispensing departments in both shops; that the Leith Depôt, Limited, employ none but qualified chemists and druggists in these departments, and that is proved to be strictly true, because the only men employed in the dispensing department in the Leith Walk shop are Mr. Dodds and Mr. Bainbridge, and the only man employed in the dispensing department at Ferry Road is Mr. Forwell. They had another man, who has left, and they intend to get a second man. Therefore it is strictly true that none but qualified men are employed in these departments.

The Sheriff: So far as regards Forwell and Dodds they are both qualified, but as regards Bainbridge, I confess I know nothing.

Mr. Orr: I did not think it necessary to call him, because one is sufficient; we have one qualified man at least in each shop. We are not carrying on our trade under any exaggerated representations; we are making statements which are literally true. We do not say that the Leith Depôt consists of shareholders who are qualified. We say to the public, "You are perfectly safe to deal with us in the matter of prescriptions and drugs; we employ qualified and efficient men in both our shops." That brings me to the question of the first charge, or the first two charges relating to the Company, and I invite your attention to the terms of these charges. They are brought under sections 1 and 15 of the Act of 1868, which sets forth, I think, three offences which may be committed—selling poisons, keeping open shop for retailing, dispensing, or compounding poisons, and assuming or using the title chemist and druggist or chemist or druggist. In the 15th section I find added the words, "exhibiting the title of pharmaceutical chemist;" and there is a fourth possible offence or failure to conform to any regulation as to keeping and selling poisons; and, fifth, any one who shall compound improperly any medicines of the British Pharmacopœia. The only offence which is selected as against me is that I put up, used or exhibited a certain title above my door, and that title is "chemists and druggists." This charge does not deal with trading, selling, or keeping open shop, but only with putting up a certain sign. Now, your Lordship will observe that the sign I am charged with putting up is that of "chemists and druggists," and it is important to notice the precise words, because "chemists and druggists" are technical terms, and they have a special meaning assigned to them. Your Lordship knows the definition of "chemists and druggists" supplied by the 3rd section of the Act. Now, I am charged with putting up or exhibiting this title which has a special and distinct signification in law. Do the facts bear that out? Are they sufficient to prove that? It is not really disputed that the title, which I have above the doors of both my shops, is that of "wholesale chemists and druggists," and that the title appearing on the face of my circulars is that of "wholesale chemists and druggists." There is one case, and one case only, where that does not appear, and that is upon the label attached to the cork which was produced.

The Sheriff: That was because there was no room on the cork.

Mr. Orr: And it was disconform to order. This cork was found in the shop of a chemist in Leith. That is not in the charge, however, which is, that I put up "chemists and druggists" above

my shops and on my circulars. Now, I am bound to say that in a case of this kind, if there is to be a prosecution and one firm to be selected for prosecution, the firm selected carrying on a somewhat extensive business in a perfectly open manner—telling the public the precise position they are in—and where it is proposed to interfere in this way by a prosecution, I think we are entitled to look narrowly at the evidence and see whether the prosecutor has proved that I put up the title "chemists and druggists." It is not really disputed that above my door and on my circulars are the words "wholesale chemists and druggists." I have not infringed this part of the section by using these words in that way. A wholesale chemist and druggist is a totally different description of a totally different thing. I am entitled to start business to-morrow as a wholesale chemist and druggist without any further qualification than I have at this moment. A man who sets up as a wholesale chemist does not require to get a qualification or to be put upon the register. If I put up above my door the title wholesale chemist and druggist I am not pretending that I am a man qualified within the meaning of Section 15 of the Act of 1868, and I am putting up a title which is not struck at by the Act. My friend in his speech only proved more clearly that that is so, because he was driven to go into an analysis of the evidence led under the charges of the two sales to prove the nature of the business. This charge has nothing to do with the business, but only with putting up the title "chemists and druggists" above the door, and for the purpose of this charge, I do not care what kind of business was carried on in the shop. Suppose I put up "analytical chemist" or "manufacturing chemist," can it be pretended that I am holding myself out as a chemist and druggist within the meaning of the Act? The precise charge made here is that of exhibiting the title "chemist and druggist." Now, that has a special meaning in law—meaning a man who is upon the register. I turn up the register, and I do not find the names of any of the shareholders of the Leith Depôt, Limited; and I look up at the sign above the door, and I find they call themselves a totally different thing. Your Lordship is not entitled to inquire what was the business carried on in this shop in order to get at the fact of putting a certain title above the door. The sole question is—was the title appearing in the complaint actually exhibited above the door? The evidence is to the effect that it was not. Your Lordship may go a step further, and ask was this a blind? That cannot be said. These people were, and are, wholesale chemists. It makes no difference that they have got dispensing departments under qualified chemists. They are wholesale chemists, and carrying on the business that they hold themselves out above the door as carrying on. It will not do to say that you are to convict them of using the title "chemists and druggists," when in point of fact they put up a different title altogether,—because among other things they have a dispensing department under a qualified chemist. That is not a contravention of the Act. If my friend meant to strike at an offence, he should have libelled the part of the section dealing with selling or keeping open shop. Possibly he may have got at the business in that way. He, however, charges me with exhibiting a certain title, and he goes into an inquiry, not as to the title, but as to the business carried on. I put up a totally different title. The business carried on in the shop is that of a wholesale chemist, which everybody knows is a totally different kind of thing from the business of a chemist and druggist, under the Act of 1868. Therefore, I say that upon the admitted evidence, that charge totally fails. My friend also referred to the memorandum as setting forth that the business to be carried on was that of wholesale and retail chemists. What has the memorandum, or the contents of the memorandum, got to do with the sign above the shop door? It is an irrelevant inquiry into a matter which has got nothing to do with the subject matter of the complaint. I think, when your Lordship considers the kind of business carried on here, and the conditions under which it is carried on—the care with which we have selected qualified men, and held ourselves out to the world as employing none but qualified men in the dispensing departments—your Lordship will be slow to look at what is totally irrelevant in order to get a conviction. Can it be said that a wholesale chemist and druggist is a chemist under the Act of 1868?

The Sheriff: Your contention is that a party who calls himself a wholesale chemist and druggist cannot be convicted, under 15th section, of taking, using, or exhibiting the name or title of chemist and druggist, even though he happens to be engaged practically in a retail business.

Mr. Orr: That is so, because what the prosecution charges me with is exhibiting a certain title. If he wants to strike at the business carried on in the shop, the Act is wide enough for his purpose; but he selects this title, and I submit that he has failed upon this charge. Now, we come next to the matter of the sales, and here again, the observation which I made at the outset applies, I think, more strongly. Your Lordship has heard evidence of properly qualified men being employed for this work, and of very careful instructions being given to them and to all the employees, and as to qualified chemists attending to the dispensing department, and that they alone were to do so. If it be the case that the two sales in question were made by unqualified men, I think even my friend would admit that it was an accident which happened in spite of the rules laid down, and an accident which might happen in any chemist's shop in Edinburgh, or in any other part of the country. If the prosecutor under this Act was going to bring cases against people for alleged violations, which, if they do occur, are not deliberate violations by people carrying on their trade in defiance of the law, but a mere accident happening in spite of rules laid down and observed, I think he would not find a dozen chemists in Edinburgh in whose shops similar things did not occur every day of the week. Let us see what the evidence is. Take first the sale of laudanum by Ovens. I do not make a point of it, but one cannot help observing that it is not a *bonâ fide* transaction; it is a trap laid by the prosecutor to try and catch the Leith Depôt, Limited.

The Sheriff: No doubt.

Mr. Orr: I am surprised that we have not had cases of similar traps being laid to catch ordinary chemists, because I cannot conceive it possible that the same thing which happened here would not happen in any chemist's shop in Edinburgh; but Mr. Hill seems to have directed his attention specially to the Leith Depôt. I do not know whether their selling at wholesale prices, or probably underselling, other chemists has anything to do with it. Mr. Hill goes as a sort of plain clothes detective peering through a glass door, in order if possible to make a case. Lord Young said that the perils attending real transactions are quite sufficient, without laying traps for people in the conduct of their business.

The Sheriff: That was in the cream case.

Mr. Orr: Yes; and the prosecution broke down in that case. I would refer your Lordship to the evidence here, and I will not repeat it in the case of the other sale—as to the rules laid down, and the instructions given by Mr. Gray to Mr. Dodds, who was employed when the Company started business in November, to the effect that he (Mr. Dodds) alone, was to dispense poisons, to do it himself, or see that it was done, and that the other employees got similar instructions; that Mr. Gray, in short, did his utmost to see that everything went on properly. Coats came into the shop one day and asked for some laudanum to be put in a small bottle. I am disposed to lay Hill's evidence out of account, because he is carried away by bias. In this case he told us a great many things about the Leith Depôt that he could not possibly know. For instance, he told us that there

was only one qualified man employed, which was not true. Then he was only once in the premises, but he told us——

The Sheriff: Was it not that he believed the Company had only one qualified assistant at Leith Walk, and one at Ferry Road—Dodds and Forwell?—That is how it stands in my notes.

Mr. Orr: I thought he made that statement distinctly. He certainly is a very biassed witness. It may be, perhaps, professional bias. He says he was looking through this glass-door, which had a lot of letters on it. He was certainly in a very unfavourable position for seeing what was happening. At all events, I think it is very unlikely—almost impossible—that he could have seen the dispensing department which then existed. That dispensing department was, it seems, where the cash desk now is, where the girl sits. Mr. Ovens and, I think, Thomson told us that, so far as they could judge, that place is not visible to a person outside. They had not occasion to resort to Mr. Hill's device to ascertain whether it could be seen; but so far as they could judge it could not be seen. Coats goes inside and he gets the laudanum from Ovens. Mr. Ovens did not overstrain the matter; he did not pretend to remember the circumstances of this sale, but he says it is very likely he would be at the counter. His practice was to go to Dodds, the dispenser, and get him to fill out the laudanum. He is at the counter, and the dispensing department is in the opposite corner, two or three steps away. The evidence of the lad Coats is to the effect that Ovens just got the laudanum at his side, or at his back. The idea was that he had just to put out his hand, and had not to move away from the counter. It was said that Ovens was alone in the shop; that there was no sign of a qualified chemist, and that there was not another human being in the place, and Ovens was selling poisons to all and sundry. Is that consistent with what is proved to be the fact? You have Dodds in regular, constant attendance, and employed to make up poisons. You have it proved that the laudanum bottle out of which customers were supplied was kept in the dispensing department round at the far-away corner of the shop. Ovens had to leave the counter, go round there, fill out the laudanum and come back. Therefore, to say that Ovens had the laudanum bottle at his hand is not in accordance with the fact. I cannot help admitting that Dodds may have been out for his dinner at the time. But your Lordship will not forget that, really if this case happened as alleged——

The Sheriff: Was there any evidence to show at what hour of the day Coats called at the shop?

Mr. Orr: No, but there is perhaps one chance in a thousand that Dodds was not there. I ask your Lordship, where the business is fairly conducted under the supervision of qualified men and under strict rules as to its being properly carried on, whether you are to hold the case to be made out, upon the slender chance that the thing may have happened through Dodds not being present to look after the sale. As represented by the other side, there was no qualified man there; there was nobody in the shop but Ovens; but when your Lordship looks at the whole facts, that case entirely disappears. You have got, as I say, the case of a sale by Nicholas Dodds, a qualified chemist, and if he did not pour out the laudanum, it would be done under his supervision. I hold that if it is proved that a qualified chemist was employed in this shop, and was in constant regular attendance, then any sale by a lad at the counter of poisons which are kept in the dispensary where the dispenser works, must be held to be a sale under the supervision of the dispenser.

The Sheriff: Although the dispenser is not present?

Mr. Orr: He may have gone to wash his hands, or something of that sort. You make the conduct of business impossible if you narrow it down to such a case as this. I cannot help feeling, and expressing the feeling, that precisely the same thing as in this case goes on in every chemist's shop in the country.

The Sheriff: I think I expressed myself strongly against that in the case that was tried here some time ago. I spoke in strong terms on the practice of qualified chemists going out of their shops at their meal hours, leaving the shop in charge of an unqualified lad or assistant, who might give out the wrong medicine, such as oxalic acid for Epsom salts.

Mr. Orr: No doubt. Your Lordship will keep in view that there are two qualified men employed here, and that when one is out, the other is in the shop, and that everything is done so far as human foresight can do it, to see that the business is properly carried on; and if a case should happen by chance, I think your Lordship will be very slow to convict the respondents here under this charge. It is not proved at what hour of the day this lad come to the shop. I think your Lordship must hold the likelihood to be that Dodds was present at the time. That brings me to the sale of the oxalic acid. Mr. Hill employs the lad Coats to go into the shop to buy a pennyworth of oxalic acid. If Mr. Hill does not know, he ought to know, that pennyworths of oxalic acid are sold by all sorts of drysalters and grocers, and I hope after this case is over, he will be able to direct his attention to these people. The Leith Depôt sell oxalic acid being a poison scheduled in the Act. Coats gets oxalic acid from Thomson. It is said that this sale is not made by us under the supervision of a qualified chemist. My friend Mr. Shaw set up an imaginary case of a man of straw, and said here is this unqualified lad at the counter; he has got numbers of packets of Gregory's mixture and oxalic acid, among other things; he gives to the customers such packets of oxalic acid made up by some person unknown at an unknown time. He says that oxalic acid is not sold under the supervision of a qualified man. It was proved that the oxalic acid was made up in the dispensary of the shop, where none but the dispensers worked, viz., Dodds and Bainbridge. They measured or weighed out the quantities and put them up in packets ready for sale, and they were put into a drawer. Now, if the packet in question had been made up by Dodds when the customer came into the shop, and given to Thomson, and by Thomson to the customer, it could not be maintained that that was not a sale under the supervision of a qualified man. Does it make one whit of difference that the packet is made up an hour or a day before by the qualified chemist? It is he that prepares the thing for sale, and the lad at the counter is merely the hand of the dispenser in transferring the article to the customer. If you are going to hold that this is a contravention of the Act, I do not think it will be possible to carry on business without coming within the meshes of the law. Oxalic acid is a thing that is asked for daily and hourly, and is used for washing and cleaning purposes, and it is a mere matter of detail and convenience that it is made up ready in packets, and that is done by the hand of a qualified man. I hold that that is what was done in this case.

The Sheriff: I suppose a qualified chemist and druggist can sell as much oxalic acid as he pleases to a customer, and as much laudanum as he pleases.

Mr. Orr: I have no doubt.

The Sheriff: It might be more for the safety of the public, if some restriction were put upon the quantity sold in that way.

Mr. Orr: My contention with regard to the way in which the oxalic acid is made up is that the same thing is done in all chemists' shops. I say that in any possible view the last charge is disproved. I say that it would not be reasonable nor fair, looking to the way in which this whole business is conducted—it would be an altogether unwarrantable interference with the trade—if it were to be held that these charges were made out. I think that exhausts what I have to say to your

Lordship. In any event your Lordship has sustained the objection taken to the relevancy of the two charges in connection with the memorandum of association, so that assuming your Lordship is against me on the other charges, I am entitled to a modification of expenses in that respect. It is a case of divided success, and I think the ordinary rule should be followed as to expenses. Your Lordship will, no doubt, have in view that Mr. Fairweather was included in this complaint, and that the charge against him has been withdrawn. That is another matter which will affect the expenses.

The Sheriff: Is there a person called Fairweather?

Mr. Orr: Yes.

The Sheriff: If Fairweather were here and asked for expenses that would be unanswerable.

Mr. Orr: I appear for the whole respondents, including Fairweather. It was only after the case had gone a certain length that the charge against him was withdrawn, and Thomson brought in. I think, therefore, that Fairweather is entitled to his expenses.

The Sheriff: There can be no doubt as to Fairweather. He should never have been here at all. The expenses in that case will be very small; the charge against him was abandoned at the first calling.

Mr. Orr: No, it was only abandoned on Monday last.

The Sheriff: That is a mere matter of detail affecting the amount. The expenses to be allowed are those described by the Summary Procedure Act.

Mr. Orr: I submit that this is a matter in your Lordship's discretion, and that it is a case for modification. Fairweather has incurred all the expenses up to the diet of proof. He was in the employment of the Messrs. Inman, and he is now in a situation in England. Then this charge came to his knowledge, and I understand he is coming to Edinburgh to inquire into the matter. He has been put to some considerable expense.

The Sheriff: Fairweather is unquestionably entitled to expenses, and must get them.

Judgment.

The Sheriff: The first charge in this complaint is against the individual shareholders of the Leith Depôt, Limited, in respect of their having put up, used or exhibited the name or title of "chemists and druggists" in connection with two shops occupied by the Leith Depôt, one in Ferry Road, and the other in Leith Walk, none of them being qualified. That is, of course, founded on the 15th section of the Act, which provides that it shall not be lawful after December 31, 1868, for any person to sell or keep open shop for retailing, dispensing or compounding poisons, or to take, use, or exhibit the name or title of chemist and druggist or chemist or druggist, not being a duly registered pharmaceutical chemist or chemist and druggist in the sense of the Act. That, however, must be read in connection with the 16th section, which provides that none of the previous statutory enactments contained in the Act shall extend to or interfere with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing; and, construing these two sections of the statute together in that way, it appears to me that the penalty contained in the 15th section against persons using the title "chemist and druggist" without having the necessary qualification, applies to persons who use the title "chemist and druggist" in connection with some retail business which they carry on. There would be no meaning in the exception in the 16th section if that were not so. Now there can be no doubt that the accused, or some of them, in connection with this business in Ferry Road and Leith Walk, used the title "chemists and druggists." They did that upon price-lists, labels, circulars and advertisements, and over the shop door. The issuing of the circulars, labels and advertisements properly forms the subject of the second charge, but they certainly had the title "chemists and druggists" over the door of their premises, both in Leith Walk and Ferry Road, upon the glass-doors, and upon the wire-blind of the window. It is said, however, that although they made use of this title they do not fall within the provisions of the statute, because, according to the ingenious argument of my friend Mr. Orr, they coupled the words "chemists and druggists" with the word "wholesale," and he says that wholesale chemists and druggists are not necessarily the same thing. Now, I think it would not do if a party, carrying on a retail business as chemist and druggist, and who in that capacity could not use the title chemist and druggist, were to be held to be beyond the reach of the 15th section of the statute, simply because he qualified his title with the word "wholesale." That would come to this, that a party calling himself a wholesale chemist and druggist above his door might nevertheless carry on a retail business, dealing in poisons to any extent inside. But, as I said, I think the 15th section must be read along with the 16th section; and that being so, it shows that what is referred to in the 15th section, which enacts the penalty, is the case of persons carrying on a retail business, taking, or using, or exhibiting the name "chemist and druggist." Now, there is no doubt that these parties did this. It is not matter of doubt that they carried on a retail business in drugs. It is not for me to say whether they took adequate precautions for the safety of the public or not by having a duly qualified assistant in each of their shops. I am not here to say what is sufficient or necessary for the protection of the public; I have merely to administer the Act. I may say in passing, that I doubt whether it would be sufficient, if none of the partners of such a company were duly qualified, for them simply to entrust the management of their business to another person, even although he had a qualification. The public knows nothing of the management. The public deals with these parties on the faith of their being chemists and druggists, and the duly qualified assistant may be discharged any day; he may be engaged one day and discharged the next, and the public would be left at the mercy of any person who was engaged to take his place. But it is not requisite for me to go into that matter, or to consider what would or would not be sufficient for the safety of the public. The question is whether under the statute an offence has been committed by these parties, who describe themselves as "wholesale chemists and druggists," carrying on a retail business in poisonous drugs under that title, and I am of opinion that such an offence has been committed. They are all shareholders in this company, but it appears that the management of the business was given to Mr. A. W. Gray. He seems to have been a managing shareholder or managing director, and was taking charge of the business. It is proved that David Ovens, who had three shares, was employed in one of the shops, but the real management of the business was in the hands of Mr. A. W. Gray; Ovens was only a servant in the establishment, and the other shareholders took no active part in the business. I therefore think that the interests of justice and the policy of the Act would be sufficiently vindicated by my imposing the statutory penalty of £5 upon Mr. Andrew W. Gray, and a modified penalty of 10*s.* in the case of each of the other respondents. With regard to the second charge, very much for the reasons I have already stated, I find that that also is proved as regards Mr. Gray and the other persons mentioned in this complaint. There can be no doubt that the circulars and advertisements in question, although they had the word "wholesale" upon them, were made use of by the Leith Depôt, Limited, for the purposes of their business, and not only in connection with the wholesale business, but in connection with what seems to have been a very extensive retail business; and therefore in this case also I find the charge proven, and take the same course of amerciating in the case of Mr. Gray the full amount of the statutory penalty of £5, and in the case of each of the other respondents imposing

a penalty of 10*s*. The third and fourth charges in the complaint are no longer before me as I held that they were irrelevant, and dismissed them. The fifth charge is against one of the shareholders, Mr. Ovens, in respect of his having sold a quantity of laudanum on Dec. 15 of last year to the witness, Alexander Coats. Now, the first question is one of fact, whether that was sold by Ovens to Coats. The witnesses, Mr. Hill and Mr. Coats, are quite positive on the subject. Mr. Hill—no doubt for the purpose of detecting what he considered to be an irregularity under the statute—sent Coats into the shop with a bottle for laudanum, and he waited outside while Coats got supplied, and he said that he saw Coats get supplied with the laudanum by Ovens, to whom Coats gave the bottle. In cross-examination he said, "I saw no qualified person present in the shop when the purchase was made. I could see everything in the dispensing department from where I stood. No one was there but Coats and Ovens, and a lady, who was apparently waiting for some medicine." Now, that is adhered to positively by Coats, who was in the shop. He says there was no one else there but himself and Ovens and this lady. At that time the dispensing department of the shop appears to have been just kept in a corner of one part of the shop. The only separation seems to have been a sort of stand or elevation, I think, on the top of which labels were kept, which may partially have concealed any person standing behind from a person looking in from the outside. I entertain no doubt upon the evidence that there was no one there except Ovens and the other persons mentioned, and that the laudanum was put up by Ovens and given to Coats on that occasion, without any supervision over him or any person to look after him, and Ovens was not a duly qualified person. It may be that this was not a very frequent occurrence. I am not sure of that. It seems that considerable quantities of laudanum are made by the Leith Depôt, Limited, and it is said that these are not made for the trade or for the wholesale trade, but supplied to their own business, and it is possible that a considerable amount of laudanum in small quantities at a time may have been sold in this way. At the same time, there is only the one act proved against Ovens, and it is as far back as December 15. It is quite possible it may have been done when Mr. Dodds, the qualified chemist, was out of the shop, and who, if he had been in the shop at the time, would probably have supplied the customer. I think, however, that a statutory offence has been here committed, and in this case I fine Ovens in the modified penalty of £2. I find these parties also liable in expenses according to the expenses allowed by statute to the complainer. There is a sixth charge, which is against Mr. Fairweather, who ought never to have been here; he was brought here by mistake, and the charge against him was departed from. He is entitled to his full expenses as against the complainer. Then as regards the separate complaint against Thomson, who was mistaken for Fairweather, apparently, by the prosecutor's witnesses at first, it is that he sold oxalic acid on the 18th of May, not having a qualification. The evidence shows that packets of oxalic acid, made up under the supervision of a duly qualified man, are kept in an open drawer within the shop, a place where they are accessible to all, and for all that I know there may be other articles in the drawer along with them, such as Epsom salts or anything else. I cannot say that I consider that a safe system for the public; but whether safe or not, it is the fact that this oxalic acid was sold, according to the evidence of Coats and Mr. Hill, without there being any duly qualified person present to supervise the sale. I therefore find this charge also proven, and take the same course as I did in the case of the charge against Ovens, and fine Wharton Thomson £2, with costs.

Mr. Orr: I do not know that I am in order, but it occurs to me in view of your Lordship's remarks on the first charge that it is by no means clear upon page 2 that the exhibiting of the title, first on the door and second on the circulars, are not simply two modes of committing the same offence.

The Sheriff: I deal with them as one act.

Mr. Orr: Your Lordship imposes separate penalties.

The Sheriff: No. I am only imposing one penalty. You cannot impose two penalties for the same thing. There is one penalty under the first charge and one penalty under the second charge, that of sending out the circulars, etc.

Mr. Orr: That is the point to which I desire to draw your Lordship's attention. I think these are just two modes of committing the same offence, because they both occur under "in so far as."

The Sheriff: Yes, but they are different acts.

Mr. Orr: They are not different under the section. The illegal thing is exhibiting the title.

The Sheriff: It is the one offence.

Mr. Orr: It is said to be done in two ways.

The Sheriff: But they are different acts, and you cannot impose a double penalty for the same act.

Mr. Orr: I am in your Lordship's hands, but it struck me that we have only one offence as libelled—a contravention of section 15.

The Sheriff: Two separate acts of contravention.

Mr. Orr: The prosecutor concludes that part of his case by saying, on top of page 3, "whereby each of the parties became liable in a penalty." It is one offence. He says that they did it in these different ways, but it is one contravention of the statute.

The Sheriff: That is quite true: my attention was not called to that.

Mr. Orr: The prosecutor only concludes for the one penalty in respect of both these charges.

The Sheriff: We should not perhaps have dealt with these charges as separate.

Mr. Orr: I was treating them as one offence committed in two ways. It appears as one offence. Probably your Lordship will therefore impose the one penalty simply.

The Sheriff: It is not a well-framed complaint.

Mr. Orr: It is treating it as two *medi* of the same offence.

The Sheriff: It is not asking separate penalties.

Mr. Orr: Would it do simply to describe the first offence in the interlocutor imposing the penalties?

The Sheriff: I have pronounced interlocutors already speaking of the first and second charges.

Mr. Orr: I would not make any difficulty in an appeal about the penalty being imposed in respect of the first and second charges. I certainly would take no objection to the want of specification.

The Sheriff: I do not think you could; but still, there might be a difficulty.

Mr. Orr: I think a little explanation would put that right. I don't anticipate any serious difficulty.

The Sheriff: I shall find the respondents guilty of the offences set forth in the first and second charges of the complaint; and the respondent David Ovens guilty of the offence libelled in the fifth charge; and shall find the respondents liable to the complainer in expenses. Then, as regards Robert Fairweather, in respect that the charge against him has been abandoned, I shall find the complainer liable to him in his expenses.

Mr. Orr: Might we not get over the difficulty by simply describing the offence? The charges are not numbered in the complaint.

The Sheriff: I will put it right in the interlocutor.

Mr. Orr: Your Lordship will understand that I should desire a case stated for a higher court.

The Sheriff: Of course, but that is not for me to do at this stage; you will arrange the matter with Mr. Morison. It is only in the event of your failure to concur, which I hope will not be the case.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Skinner, Senier, Prosser, Benger, Haydon, Ignoramus, Student, Ignotus.

SOLE

IMPORTERS

OF

APOLLINARIS WATER,

FRIEDRICHSHALL WATER,

HUNYADI JÁNOS WATER.

THE

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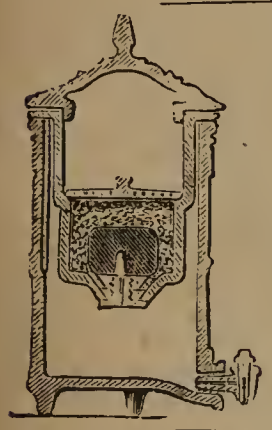

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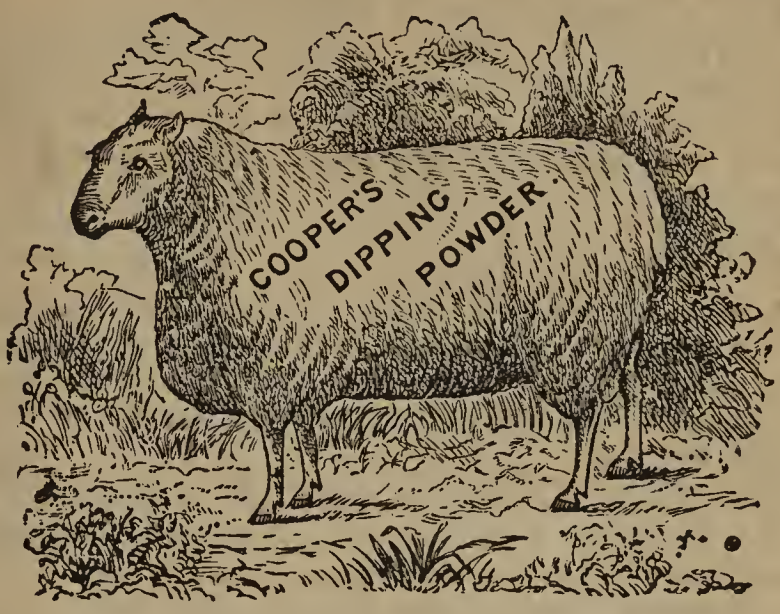

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Preliminary -	5 sent in, and all passed.

JUNE.

Major - - -	Mr. W. H. CLUBB, Liverpool.
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St. Leonards.

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Richmond.

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Dispensing Chemist.

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The
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AND
Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

PROFESSORSHIP OF BOTANY.

The Chair of Botany in the above Society's School of Pharmacy will become vacant at the close of the present Session through the resignation of Professor Bentley. The Council invite applications, which should be accompanied by testimonials. The Professor will be expected to lecture from October to July, and will not be required to teach Materia Medica. The stipend is £150 per annum, with the students' fees.

Applications should be sent in on or before July 23rd.

Further information may be obtained on application to

RICHARD BREMRIDGE,
Secretary and Registrar.

COUNCIL EXAMINATION PRIZES.

First Prize.—Pereira Medal in silver, and a present of books value £5, or thereabouts, given by Mr. T. H. Hills.

Second Prize.—The Pharmaceutical Society's Medal in silver, and a present of books value £3, or thereabouts, given by Mr. T. H. Hills.

Third Prize.—The Pharmaceutical Society's Medal in bronze, and a present of books value £2, or thereabouts, given by Mr. T. H. Hills.

The Examination for these prizes will be held in London and Edinburgh on Saturday, the 23rd instant, at 10 a.m.

Pharmaceutical Chemists who have passed the Major Examination during the present Session, and who were Associates of the Society at the time of passing the Examination, are entitled to compete for the Prizes.

Persons intending to compete must give notice of their intention to the Registrar, on or before Monday next, the 18th instant, after which no further entries will be received.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

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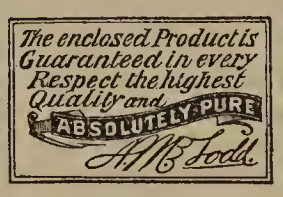

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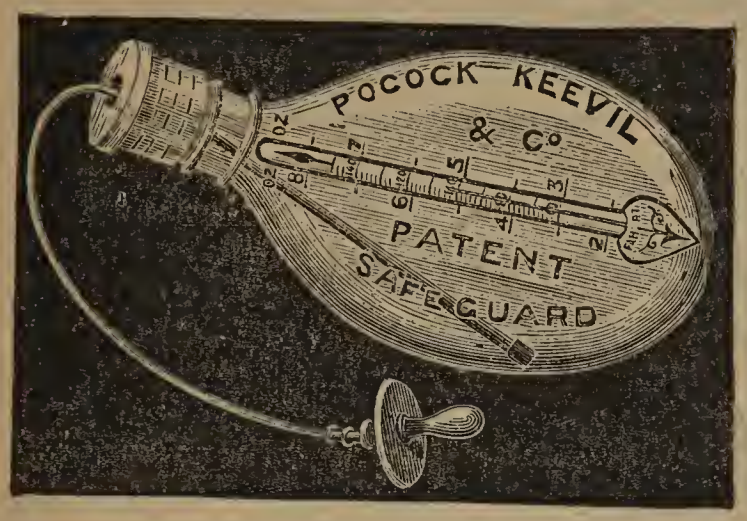

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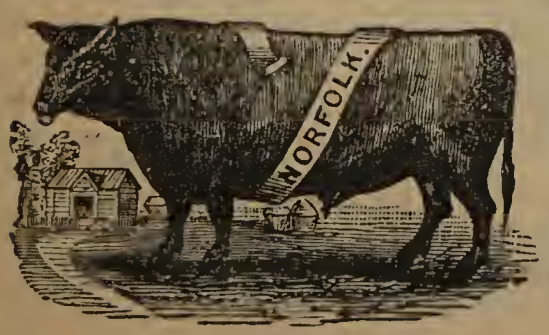

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COUNT FICALHO'S HISTORY OF GARCIA DA ORTA AND HIS TIME.

BY PROFESSOR FLÜCKIGER.

Among the publications of the "Sociedade de Geographia de Lisboa," there is to be noticed a very valuable catalogue of the useful plants of the Portuguese possessions in Africa, by the Professor of Botany in the Polytechnic School of Lisbon, Count de Ficalho: "*Plantas uteis da Africa Portugueza*," published in Lisbon, 1884, *i.e.*, the first part of the volume, 279 pages, in 8vo, which contains the Dicotyledons and the Gymnosperms. I am sorry the second part, which will be devoted to the Monocotyledons, has not yet made its appearance.

In the first part of the 'Plantas uteis,' the author gives a very careful history of the discovery and the exploration of the countries which he terms "Africa Portugueza." From this preface it is evident that Count Ficalho is not only thoroughly acquainted with the geographic literature of his own people, but also with that of England, France and Germany, and his catalogue is far from being a mere enumeration. He gives a very full and interesting account of every one of the plants he deals with, and here again I am pleased to see that the author furnishes in a very correct and exhaustive way all the botanical, practical and historical references which may be desirable in order to illustrate each of his "Useful Plants." I have read with particular interest, especially the chapters on *Xylopia æthiopica*, *Jateorhiza Calumba*, *Adansonia digitata*, *Cola acuminata*, *Arachis hypogœa*, Tamarindus, the several Copal plants, *Carica Papaya*, Coffea, Landolphia, Sesamum, *Manihot utilissima*, and many others.

Count Ficalho with good reason restricted his work to the African settlements of Portugal, those in the Indian Peninsula being too insignificant. They were important in the sixteenth century; Goa was then a great centre of commercial activity, but is now entirely superseded by Bombay. In Goa there was living, apparently for about thirty years, an intelligent surgeon, Garcia da Orta, physician to the Portuguese Viceroy and to a hospital of Goa. This city was the place where most of the drugs occurring in the various regions of Asia were to be met with in the bazaars as they are now-a-days chiefly in Bombay. Garcia da Orta zealously availed himself of the exquisite opportunity of examining these drugs, at least the more interesting among them. He compiled his observations in the volume which bears the following title: "Coloquios dos Simples e drogas he cousas mediçinais da India e assi de alguas frutas achadas nella onde se tratam alguas cousas tocantes amediçina, pratica, e outras cousas boas, pera saber copostos pello Doutor garçia dorta; fisico del Rey nosso senhor . . . . Impresso em Goa, por Joannes de endem as x dias de Abril de 1563 annos."

A colloquy is not precisely the form which would answer to the taste of readers in our days, surely not in questions of materia medica. But Garcia's 'Coloquios' are nevertheless one of the most remarkable documents of the kind. The original edition is at the same time a book of utmost importance to bibliophiles or bibliomanes, for it is thought to exist only in a few copies still, say a dozen; Count Ficalho states that he knows of one in India, three in Portugal, one in the Paris library, and one at Leiden. I have consulted that of the British Museum.* But the knowledge of Garcia's notes or Coloquios was very soon widely spread by the Latin translation by Clusius, first published in 1567.

Garcia da Orta being one of the most interesting Portuguese authors of his time, it is or was a pity that but very little was known as to his person. It was a good plan, therefore, proposed by the Royal Academy of Lisbon, to cause a new edition of Garcia's work to be elaborated, and to have it accompanied and elucidated by critical notes concerning of course also a biographic investigation. The Academy had the excellent fortune to possess among its own fellows the only man to whose care that task could be safely entrusted; Count Ficalho had largely proved by his 'Plantas uteis da Africa Portugueza' that he was the right man to appreciate and illustrate Garcia da Orta.†

I have been most obligingly presented, by the author, with the first part of his investigation, which appeared under the title: "*Garcia da Orta e o seu tempo pelo Conde de Ficalho, Lente de Botanica na escola polytechnica, Socio effectivo da Academia real das Sciencias de Lisboa.*" Lisboa, Imprensa nacional, 1886, 4to, 392 pp. 8vo. In the preface the author states that he felt obliged to seek first for information about Garcia's person before elaborating the new edition of the Coloquios. In doing so, Count Ficalho considered at the same time the period of Garcia's stay in India from a general standpoint, and at last secured such an amount of new and interesting information that he justly resolved to publish in the first line a book *about* Garcia, that under notice, being a very acceptable introduction to the Coloquios which are to follow.

Count Ficalho has not succeeded in discovering any information about the family of Garcia, nor of the date of his birth, but he shows that Garcia was a native of Elvas, in the upper (or eastern) part of the Portuguese province of Alemtejo (not far from the Spanish place of Badajoz), where he was born, in all probability, towards the end of the fifteenth century.

It is proved that Garcia devoted himself to the study of medicine in the Spanish universities of Salamanca and Alcalá de Henares, near Madrid. Particulars on Garcia's personal work in those high schools are wanting; the author, as he expressly states in the very title of his book: "Garcia da Orta *and his century*," or time, attempts, on the other hand, to afford an attracting picture of the way in which the Spanish "Estudante" of the sixteenth century satisfied his thirst of science. In Salamanca, where the number of students frequently exceeded 6000, or even nearly reached 14,000, the study of medicine was based as well on the old Greek and Latin classical books as on their Arabic followers, some of which were translated in Salamanca. In the old Roman town of *Complutum*, now Alcalá de Henares, Hippocrates would appear to have been prevailing; this university had been established in 1498, nearly two centuries later than that of Salamanca, in a period when the splendour of Arabic science and rule was on the decline. Garcia himself states in one of his Coloquios that

* See 'Pharmacographia,' second edition, 1879, 760.—There is also a copy in the imperial library of Rio de Janeiro, according to Varnhagen.

† I may also quote his 'Investigations on the Botanical Influence of the Discoveries of the Portuguese,' 1878, which I have also before me.

in Salamanca he was acquainted with a Dominican friar, Domingo de Baltanas, and in Alcalá with Tordelaguna, originally a pharmacist, but subsequently a student of medicine. As this man is stated by Garcia to have possessed some knowledge of Arabic, as well as of botany, he may perhaps have encouraged Garcia in extending his studies in those directions too. That is absolutely all we know about the few years spent by Garcia in the two Spanish universities, no other trace of his stay there has been discovered, not even in the records of either Salamanca or Alcalá.

In the second chapter: "Castello de Vide and Lisbon," the author is happy enough to introduce two documents of the 5th and 10th of April, 1526, one of which had not been printed before. In these charters the lecenceado Gracia dorta or Guarcia dorta, then an inhabitant of the town of Castello de Vide, a small place south of the region where the Tejo enters into the Portuguese territory, is stated to have passed his examination, and acknowledged to be "soficiemte e ydonyo na teorica como na pratica" as a "fisyquo." King Joham III. consequently authorizes Garcia to cure throughout the realm of Portugal, and even to travel, for that purpose, on horse or mule's back. At Castello de Vide the young medico de provincia, Garcia da Orta, spent six years. By what means he succeeded in making his name known to the scientific body of the metropolis cannot be traced, suffice it to say that Garcia was called, in 1532, to a professorship in the University of Lisbon. But strange enough, yet quite in accordance with the views of that time which ruled all the universities of the Peninsula, Garcia's lectures were devoted not to medicine, but to the "Summulæ logicales," an abstract of scholastic logics. Count Ficalho explains that the mediæval sentence: "Dialectica est ars artium, scientia scientiarum," was not yet overthrown by the evolution of those sciences which now are holding the prominent place in human exertion throughout the civilized world.

Garcia happily occupied his philosophical chair in Lisbon only from January, 1532, to February or March, 1534; nothing more is recorded as to his other occupations there, neither by himself nor by any contemporary writer. It was a brilliant period of Portuguese story, that of the admirable discovery of and success in India, when Garcia lived in Lisbon.

He appears to have been early acquainted with the great and noble family de Souza, who partly resided in Alemtejo, the native province of Garcia. Dom Martim Affonso de Souza, one of the distinguished navigators of Portugal, being appointed chief admiral, "capitão mór do mar," for India, chose Garcia his physician. He had, in all probability, been honoured for a long time already by Dom Martim Affonso's friendship, so at least Count Ficalho shows it to be probable. In the Coloquios, Garcia mentioned the admiral in high terms of real affection, and dedicated the book to Dom Martim.

When the admiral's squadron arrived in Goa, in the fall of the year 1534, the Portuguese possessions were governed by Nuno da Cunha, a worthy successor to the great men who had established in India the power of their nation. Great things remained still to be done in order to settle ultimately the Portuguese dominion, and the admiral, Dom Martim Affonso, had to perform several expeditions and surveys in the interest of his country. Doctor Garcia, who accompanied him, no doubt took great interest in these explorations along the coasts of India, and availed himself diligently of the excellent occasions for procuring exact information on several drugs; he also visited the famous temple of Elephanta; the chapter iv., "Baçaim e Diu" gives the interesting narrative of those campaigns to the north-western coasts.

In the year 1536, the governor or viceroy, Nuno da Cunha, ordered Dom Martim Affonso de Souza to the coast of Malabar, where a struggle was engaged between the Rajahs of Calicut and Cochim. This expedition, which Garcia accompanied as a military surgeon, also afforded him the invaluable opportunity of examining *in loco* the most important medicinal plants and drugs; he spent the end of the year 1537 in the port of Cochim, then a very great emporium of spices and drugs. In 1538, a similar expedition of the Portuguese fleet under command of Dom Martim Affonso being directed to Ceylon, Doctor Garcia da Orta probably paid a short visit to that island, but we are not sure of the fact. In his Coloquios he speaks of the productions of Ceylon so exactly as to suggest that he made a stay there; thus, for instance, Garcia displays a good knowledge of the precious stones for which the island has always been famous. Very likely he had acquired some mineralogic notions during his university studies in Spain.

In 1538, Dom Martim Affonso was called back to Portugal, but Garcia appears to have been settled at Goa quite satisfactorily, so that he continued there and was again rejoined by Martim Affonso, when this nobleman returned to Goa, and occupied, from 1542 to 1545, the high post of governor-general of the Portuguese possessions. Count Ficalho skilfully collected every kind of information relating to the way of living, to the commercial and intellectual resources of that Portuguese colony in which Garcia da Orta spent his life in useful work, both as a medical practitioner and an investigator of the natural productions of the East; the splendid metropolis of Goa no doubt was an excellent place to a man like Garcia. He was also appreciated in Portugal, for in one of the Coloquios, in speaking of another governor or viceroy, evidently after the time of Martim Affonso, Garcia mentions that the king of Portugal, João III., had pointed out to the new governor (D. Pedro Mascarenhas), that, with regard to Garcia da Orta, it was not necessary to take with him a physician from Portugal to Goa. By perusing critically the Coloquios, Count Ficalho was led to the view that Garcia in all his doings and living was guided by very sound principles; he appears to have avoided the temptations of the opulent high life of the vice-regal court and its tricks, as well as the exaggerated exertions and ceremonies of an idolatrous church, although, on the other hand, Garcia evidently was honoured by the governors and the Portuguese colony, as well as by the indigenous princes and wealthy people, who were indebted to his medical services. Garcia, also, was always a devoted son of the church, and a friend of the Franciscan and Dominican orders settled in Goa. The famous poet, Luiz de Camões, one of the illustrious of Portuguese literature, was on very good terms with Garcia, whose Coloquios the poet favoured with an ode in verses, which, however, appear to have been printed very incorrectly. Without knowing exactly the place of

Garcia's residence at Goa, it may be inferred from incidental quotations in the Coloquios that his cottage and garden were in a commanding situation; here the physician and naturalist enjoyed, apparently as a bachelor, his leisure hours. He delighted in the cultivation of useful plants, and especially of the various edible fruits of India. Sometimes the doctor also sent exquisite fruits to the palace of the viceroy. Garcia's gardens were attended by numerous servants, as shown in the Coloquios, where mention is made of a native doctor who devoted his services to at least the female part of Garcia's slaves; the doctor of Salamanca or Alcalá kindly, and, perhaps, prudently allowed that people to resort to his Indian medical colleague Malupa. Garcia also possessed an estate at Bombaim, now Bombay; Simão Toscano was the name of Garcia's farmer there. The doctor quotes a lot of books in his Coloquios; certainly he had them at hand in his own library, which, therefore, may be supposed to have been the richest in India, at least in books on materia medica or botany and medicine; it also is evident that Garcia had a collection of drugs and curious things of natural history in his rooms.

The vivid picture of Garcia's life at Goa would not be complete without expressly dwelling also on his affectionate friend the Prince Nizamaluco or Buhran, to whom Garcia paid several visits in that ruler's magnificent metropolis Ahmednaggar. Here the Portuguese doctor met with the learned Mussulman physicians (Hakims), to whom he was no doubt indebted for a good deal of his intimate knowledge of Indian materia medica. Ficalho gives at length the interesting story of Buhran Nizam Shah, an intelligent and learned prince, who was in constant good relations to the Portuguese Government of Goa.

Garcia da Orta was already mentioned to have had a farmer at Bombaim, or Bombaym, the island now occupied by the city of Bombay. The learned author of the book under notice is of the opinion that Doctor Garcia had taken in lease the whole of the said island, certainly a most interesting fact. We refrain from following here Count Ficalho's convincing arguments (p. 261), but they seem to be absolutely in favour of his suggestion. He treats that question skilfully in the best historical way, affording or quoting a full set of documents, both published and unpublished notes from the Portuguese archives. Certainly, a most unexpected and most curious result of Count Ficalho's excellent investigation, viz., Garcia da Orta's chief receiver or farmer ("rendeiro," p. 217) collected the rents of his employer probably on the very same grounds which are now occupied by one of the grand emporia of the British Empire in the East.

Two chapters of Ficalho's book are devoted to a short, but highly interesting review of the Coloquios, which are duly appreciated as well as their author, whom the Count (p. 350) shows clearly to have been "the right man in the right place." But Ficalho at the same time (p. 381) is fully aware that Garcia's work was very badly written, that there is no order in it, that its style is utterly wanting of anything like consequence, method or elegance, notwithstanding the unusually large amount of excellent observations it affords. Ficalho gives a list of about fifty books which Garcia quotes repeatedly in his Coloquios, and also points out some of the most remarkable plants or drugs met with in the Coloquios. They had, we may say, the good chance to be translated, as early as in 1567, by the most competent man of the time, viz., Charles Clusius, but we fully understand that the Latin translation, which was thoroughly modified by Clusius, is but moderately esteemed by the Portuguese. The new edition by F. A. Varnhagen, Visconde de Porto Seguro (Lisboa, 1872), is but a reprint of the original work which had been carelessly printed at Goa, and Varnhagen seems to have even increased the number of mistakes. So it will be an honour due to the memory of that eminent Portuguese naturalist to prepare a good edition of the Coloquios and to illustrate it by critical notes. This will be a rather difficult task; the editor ought to be thoroughly acquainted with botany, geography, history, and should also be conversant with the leading idioms both of Europe and India; certainly an amount of knowledge not frequently to be found in one person. The book before us happily proves that Count Ficalho is the right man; to all those scientific qualifications he joins a good deal of noble and enlightened patriotism, desirous of illustrating Dr. Garcia da Orta as a distinguished "representante do espirito portuguez," one of the "robustos e originaes homens do XVI seculo." A thoroughly competent man, Joaquim Heliodoro da Cunha Rivera, who lived for some time at Goa, stated in a letter to the author, that he was not able to trace at Goa any reminiscence of Garcia. Rivera's investigations even proved not a single copy of the Coloquios to exist there, in the very place where they had originated. Even the date of Garcia's death is unknown, nor are we informed whether it occurred in Goa.

Count Ficalho's book gives an attracting sketch of the most interesting and important periods of Portuguese story, and on this animated and rich background some of the outlines, as exactly as they could be traced by the endeavourings of that well-informed and zealous investigator, become apparent of Garcia's remarkable life devoted to materia medica and medicine itself.

Two things only remain to be regretted. In the first line, the large stock of information embodied in the book 'Garcia da Orta e o seu tempo,' ought to have been made more completely accessible by a good alphabetical index. The "Summario" of the fourteen chapters of the book is very carefully elaborated indeed, yet not quite sufficient for easy reference. And secondly, it is highly desirable to have the excellent book, or at least the essential matter of its contents, translated into English; the short notice of Count Ficalho's book which is afforded by my lines giving only a very imperfect idea of the author's work. I hope some Portuguese scholar in England or the United States will be found who may be able and willing to undertake the translation. And I hope that Count Ficalho also will be pleased to secure an English or French edition of the Coloquios, when he is about to publish the new critical edition of them which we are expecting with great satisfaction.

THE ANNATTO BUSH.

The following information respecting the plant from which annatto is derived (*Bixa Orellana*) has recently been furnished at the request of the United States Government by the Consuls of various districts in South America:—

Para, Brazil (Consul Clayton).—The name "bixa,"

which has been given to a genus comprising four species of tropical shrubs or small trees belonging to natural order Flacourtiaceæ, is the native name of the Indians of Darien for one of the species, *Bixa Orellana*.

The Brazilian name of the plant is "urucuara," or plant bearing "urucu," the latter being the Brazilian name of the pigment known as annatto.

The species usually considered as producing annatto is *Bixa Orellana*. The species is a small tree or large shrub growing from 15 to 25 feet in height, bushy from the root or forming a simple stem. The leaves are broad, heart-shaped, and pointed. The flowers, which are rose coloured or white, and somewhat resemble apple blossoms, are produced in large bunches on the ends of the young branches. The fruit is heart-shaped, about an inch long, red or greenish yellow, according to the variety, and is covered with stiff prickles. When dry it splits in two, showing the seeds in a perpendicular row on each side. These seeds, which are very numerous, are embedded in a red, waxy pulp. I have never known the plant to be met with growing wild, though one often finds it many miles from any habitation, but it always marks the site of a former house or plantation.

The two species, or perhaps only varieties grown in Brazil, only differ in the colour of the flower and fruit, which in the one are pink and red, respectively, while the other has white flowers and greenish yellow fruit. The colouring matter seems to be of the same shade in both, and I have never seen any appreciable difference between the two kinds in the quantity produced.

The tree is cultivated in the whole Amazon valley and is always seen around the houses of the Indians. It appears to attain a great age, but never becomes very large; the trunks of the largest I remember to have seen measured about 18 inches in diameter at the base. The wood is light and considered of no value. The tree is subject to no diseases, is not attacked by insects, and birds do not eat the seeds. It grows freely in any soil and no cultivation is necessary, except to shade and keep down the weeds around the young plants until they become well established. The trees must be grown in full sunshine, for if grown in the shade they do not bloom. Propagation is in Brazil effected only by seeds, and the trees begin to bloom when they reach the height of about 10 feet, which is in about three years from the time of sowing. In a cooler and drier climate, where growth would not be continuous, a far longer time would be necessary.

There seems to be nothing in the nature of the tree to prevent its being propagated by cuttings, which would probably root readily in bottom heat, and plants so obtained, following the general rule, would flower and fruit much earlier than seedlings. The plants also sometimes form many suckers around the parent, making a dense brush with many stems; when this occurs increase could be had by separation, and, as the roots are numerous, fine, and fibrous, transplanting would probably be easy. In Brazil the fruit matures rapidly after flowering, and is ready to gather in about two months; if gathered as soon as matured the tree at once makes fresh growth, and flowers and fruits anew. The practice, however, is to allow the fruit to remain on the tree until wanted for use; it dries, and as the capsule does not readily burst the seeds remain long in good condition. Within a few months the tree is again in bloom, and usually one sees flowers and both immature and dry fruit on the tree at the same time. With the most careless culture two full crops can be gathered every year.

The preparation of the pigment is very simple. The seeds are macerated in water until the pulp, which is readily separated, is removed, The water is then passed through a strainer made of strands of palm to remove the seeds and fibre, and is then evaporated in the sun until the mass becomes thick. This mass is then rolled in leaves, producing roll annatto, or it is evaporated to dryness and made into cakes, producing mass annatto. Sometimes the seed as taken from the pod is simply dried for market and forms what is known as "Urucu em grao."

The pigment is extensively used by the Indians in dyeing the threads of hammocks and by the wild Indians for painting their bodies, they mixing it with turtle oil or the fat of the peixe-bois (manatee). In Para it is sometimes used to give colour to cooked rice, but I have never heard of its being so used on the Amazon. An infusion of the leaves drunk hot is considered by the Indians a remedy for jaundice.

An American gentleman who has explored the Amazon valley from Para to Iquitos, Peru, informed me that he had never seen in any of his travels any systematic culture of the urucu, and very little of the said article comes to this market from the territory through which he has passed. He noticed that each house or village had enough trees for the use of its inhabitants, but as far as he observed there was no disposition to make the urucu an article of trade. There is a small annual export from Para, which, I learn, comes from the Igaripe-Meri, distant about a day's voyage from this city, where there were formerly some plantations, but at present there is very little attention paid to the culture, and the plantations are neglected.

The quantity of annatto exported to the United States from this consular district during the last two years amounted to 27,435 pounds, and valued at 6816 dollars.

Barranquilla (Consul Vifquain).—The annatto, called by the natives achiote, grows spontaneously around here, but none is raised for exportation from this consular district. It has no marketable value here.

I have a cluster of seeds before me. Many clusters are found on the bush, and each cluster has some twelve pods, and each pod contains about twenty-four seeds. It is not as heavy as wheat, but heavier than barley. I should say it weighs some 54 pounds to the bushel. I am told that one bush furnishes very often 1 bushel, a most enormous yield considering the size of the seed.

The cluster of pods reminds one of a cluster of cockle burs. It has the same colour, but, unlike this pestiferous bur, it is not persistent in its adherence.

The annatto grows in a dry climate as well as in a wet climate. At least, it looks as well now in the dry season (we have not had a drop of rain for four months) as it does in the rainy season, when it rains every day more or less, and rather more than less.

The natives use the annatto for colouring purposes. They are very found of colouring victuals for the table here. It adds nothing, however, to their quality. The Indians use it as a defensive armour against the frisky and still more pugnacious mosquito. They crush the seeds "and anoint their naked limbs with the stuff."

Panama (Consul-General Adamson).—Annatto is not cultivated here, but is found in its wild state in all the coast districts of this republic, and it is not an article of commerce here.

My personal acquaintance with the plant leads me to believe that its favourite habitat is within 15 degrees of the equator on the lower lands, in a soil of sandy loam, which is well irrigated for a part of the year, and that it is hardly probable that it would thrive in California, but that it might be expected to flourish south of the frost line in Florida.

Porto Rico (Consul Conroy).—The *Bixa Orellana* is disseminated through the whole island of Porto Rico. This shrub or small tree may be said to be here of spontaneous growth, for there is no instance of any regular plantation being established, nor of any careful cultivation being given to the plant.

The country working people are fond of having planted near their little homesteads two or three shrubs for the sake of the fruit, which they use as a condiment in colouring and seasoning their messes of rice and other food, in place of saffron or red peppers. The annatto plant in its natural or wild state is a scraggy, straggling bush, which often attains a height of 8 or 10 feet, but

no doubt by proper cultivation and judicious trimming and pruning its condition and growth would be much improved, and its producing capacity would be greatly increased.

A very small quantity of annatto is exported from this province, either to Spain or the United States, but no other preparation is given to the article than merely drying the pods in a current of air under shelter from the sun, and then packing them in bags or barrels.

There are two kinds of annatto known to commerce, the "flag" and the "roll." The former is more abundant and more generally used, the second is scarce, and demands the higher price. Both are preparations from the same raw material.

The current value of the article in the crude state in which it is shipped is about 4 cents per pound.

As this plant is scattered and grows wild all over the entire island without any care being given to its culture, no true estimate can be given as to the cost of its production. It is gathered mostly by women and children, and disposed of in small quantities at the shops in exchange for provisions and groceries.

BADEN AND VOSLAU AS HEALTH RESORTS.*

The distance from Vienna to Baden is 17½ miles. Vöslau is a few miles further off on the same line of railway, which is the Southern. What struck me on reaching Baden was the completeness of the change; it was nearly as great as that between London and Brighton. I could scarcely believe that the large city of Vienna was less than 18 miles distant. The scenery is not only that of the country, but also of a very pretty country, diversified with mountain ranges. I was struck, moreover, with the points of resemblance between this Baden and Baden-Baden, the Helenenthal in the former being not less beautiful a walk than the Lichtenthal in the other; while a castle perched high up on the mountain side recalled that which attracts visitors to Baden-Baden. The Schwechat, which flows through the Helenenthal, is a stream of the same size as the Oos, which flows through the Lichtenthal.

Baden is not merely a small town where there are mineral waters and to which the Viennese resort for change of air and scene; but it is also a watering-place to which invalids flock from many parts of Europe, and where a regular course of bathing and water-drinking can be pursued under medical supervision. The visitors number 15,000 yearly, and the majority undergo a regular course of treatment. There are more than a dozen resident physicians, and it is as common to consult a doctor on arriving there as it is at other watering-places. Some of the doctors complain that invalids venture to treat themselves. These foolish persons are styled "savages." The doctors comfort themselves with the reflection that the "savages" will take the wrong baths, drink of the waters in an unorthodox style, and suffer well-deserved torments.

The Cetisch range of mountains, on the southern slope of which Baden lies at the height of about 700 feet above the sea, shelters it from the north and north-east winds. The temperature is neither too high in summer nor too low in winter, though the weather is raw and cold in spring and autumn. For the year the mean temperature is 50° F.

Owing to the equable and moderate temperature, plants and flowers of all kinds are luxuriant. As springs of warm water abound, the earth is never very cold, and this contributes to the growth of almond and fig trees and of plants which generally come to perfection in more southerly spots. Higher up on the mountains the flora has an Alpine character. Pine and beech trees clothe the mountain slopes and impart fragrance to the air.

Thirteen mineral springs are in use, and all resemble each other in their constituent parts, the chief of which is sulphur. Wherever a hole is bored mineral water is found. Even in the bed of the Schwechat stream mineral water bubbles out. The water contains salt as well as sulphur, and the predominant gas is sulphuretted hydrogen. After drinking it I can confirm what Dr. Hoffmann says when he writes that the water has an unpleasant salt taste and smells of rotten eggs. Some ladies who bathe in it are unpleasantly reminded of the nature of its ingredients when they find the metallic cosmetics with which they have beautified their skins suddenly change to a dark brown or jet black. All ladies are warned against employing such cosmetics, and, when they know the consequences, they gladly obey. They are warned also against carrying gold or silver ornaments when they go to bathe, as the gold acquires the hue of copper and the silver of iron. In answer to those who contend that the presence of sulphuretted hydrogen in the water may prove injurious, Dr. Schwarz replies that the quantity contained in the Baden mineral water is just sufficient to do good, and not enough to work mischief. Dr. Hoffmann's decision is, that should the sulphuretted hydrogen really act injuriously, the salt in the water forms an antidote. It might be better to have the antidote without the poison.

The mineral water is more used for bathing than for drinking purposes. When issuing from the ground its temperature ranges from 80° to 95° F. There are sixteen well-appointed bath-houses. One of them, the Caroline bath, is specially set apart for ladies; but Dr. Hoffmann notes that most ladies prefer going to the bath where gentlemen bathe also. The truth is that the custom prevails of bathing in common. A dress is worn by both sexes, and as the bathers remain immersed up to their chins, all that the spectator sees is a mass of more or less ugly heads. It is said that each bath is completely emptied and cleansed every Friday, and this is held forth as a recommendation. I should enter the bath with greater pleasure if I were assured that the water was renewed more frequently.

A long list of ailments is given for which these mineral waters are recommended. The principal ones are rheumatism, anæmia, gout, and scrofula. A large number of the poorer Viennese, particularly children, suffer from anæmia and scrofula, and a course of treatment at Baden is of great service to them. Hospitals and asylums have been founded for the reception and treatment of the poor; thus Baden is a great benefit to Vienna as well as a pleasant place of resort. I learn that in many cases the waters have an unpleasant action when first employed. Those who come with coughs begin to cough oftener. Gouty and rheumatic patients become weaker and uncomfortable after bathing for a fortnight. Most patients appear to regard such results as natural, and when they suffer from fresh pain they consider that they are in a fair way towards recovery. "The pains have begun" is an exclamation which it seems to please them to make. By common consent among the patients the cure is supposed to last either twenty-one or forty-one days. The doctors protest against this, and say, with justice, that the number of baths to be taken must be determined by the patient's condition; but they find it hard to fight against a general and deeply-rooted opinion.

Patients are subjected to a regular course of dietary, and this, combined with the fine air, may contribute as much to their cure as the baths and waters. A long list of things to be avoided is given; but this I need not reproduce, as it is chiefly useful for those who are under medical treatment. The doctors at Baden take good care that their patients shall not go wrong for lack of minute advice. Thus they are warned to clothe themselves warmly and carefully to avoid catching cold. They are told not to walk too fast, and not to fatigue themselves. They are told also, what they might find out for themselves, that it is well to remain indoors during bad weather.

Vöslau is distant from Baden an hour by road and ten

* Extract from a series of articles on "Austrian Health Resorts" in the *Times*.

minutes by rail. Though much the smaller place of the two, it is not the less beautiful. The mineral waters belong to the category styled "indifferent," yet this does not imply that they are inactive. The waters of Schlangenbad, in Nassau, are "indifferent" also; they have a high repute, however, for their curative properties. The regular use of the Vöslau waters did not begin till 1822, though long before they had been used and prized by the country people. As the spring, after issuing from the ground, flows with a strong current it was employed at one time to drive a mill, and it was known as the warm brook. On February 27, 1768, an earthquake occurred at Vöslau, and affected the mineral spring by raising its height and increasing its temperature. At present the temperature is 75° F. A notable fact in the annals of Vöslau is that an apothecary's shop was first opened there in 1862. This was consequent upon the increase of visitors coming to be cured. Wherever visitors congregate there is a demand for drugs. It is only in remote country places that people manage to live and die comfortably without the aid of medicine.

The rising popularity of Vöslau as a health resort is proved by the increasing number of visitors to it since medical men began to send patients. In 1853 the number of visitors was 1183; last year it was upwards of 4000, and this does not include those who come from Vienna on a pleasure trip. At Gainfarn, a short distance from Vöslau, there is a hydropathic establishment under the charge of a resident physician, and this is also an attraction. The air is very light and pure at Vöslau, so that what the Germans style an "air cure" can be enjoyed. Another form of cure is drinking whey made from the milk of cows or sheep. Both here and at Baden the grape cure is prosecuted in the autumn. The grapes are very fine and very cheap. I enjoyed the Vöslau grapes; but then I ate them for pleasure, not as medicine, and I doubt whether they would not soon pall if I had to swallow several pounds of them daily for several weeks. I have heard that some physicians order as many as from six to eight pounds of grapes to be eaten every day by their patients. This seems to me far too much of a good thing. Those who steadily follow this form of cure lose all relish for grapes. The patients are enjoined to abstain from eating much else, and to dine and sup off fish, fowl, game and light puddings. They can do this the more easily as they have neither appetite nor room for heavy food.

It is in favour of the mineral waters of Vöslau that they are not said to cure everything, the maladies being limited in number in which they are supposed to act beneficially. Hysterical and neuralgic disorders, debility, and indigestion are the principal ailments of which patients come here to be cured; and I am told it is because so many actual cures are effected that the fame of Vöslau as a watering place spreads wider every year. Dr. Friedmann, who has practised here many years, writes strongly in praise of the baths. Those who suffer from loss of appetite would do well to visit Vöslau, as one marked result of a bath is to create a longing for food. Delicate and nervous children are especially benefited by the Vöslau waters. The usual amusements are provided, concerts, balls and plays being given in the Curhaus. The walks and drives are many, and the walks through the balsamic pine woods close at hand contribute to restore health and strength to the sufferers from delicate chests.

Both Baden and Vöslau are visited by those why have taken a course of waters at Carlsbad or Marienbad, and who, after drinking the Sprudel or Kreuzbrunn for several weeks, require an "after-cure" in the form of repose and refreshment. I have not heard of the English and American visitors to Carlsbad or Marienbad trying Vöslau or Baden as an "after-cure;" many of them go to the Tyrol, where they follow the grape cure; but they might find it a pleasant change to try the watering places near Vienna.

BECHI'S TEST FOR COTTON-SEED OIL IN OLIVE OIL.*

In a lengthy and exhaustive communication the Commission of Florence has made public the results of the experiments upon the value of the "Bechi's Test" as a reliable and positive indicator of the presence of cotton-seed oil, fraudulently contained in olive oil. This Commission, appointed in the early part of last year, was as follows:—U. Peruzzi, N. Ridolfi and Professor G. Roster.

The method of Professor Bechi, as used by the Commission and with successive modifications by the author, consists in the subjection of a sample of the suspected oil to the heat of boiling water, after first having added an alcoholic solution of silver nitrate, and amylic alcohol and oil of rape, in the manner and proportions hereinafter indicated.

Take 1 grain of crystallized silver nitrate and dissolve in the smallest possible quantity of water (about 1 c.c.) and add 200 c.c. of alcohol (96°). The addition also of 20 c c. of sulphuric ether is a good one, in that it makes the reagent better miscible with the oil to be examined, but it is not necessary. On the other hand prepare a solution composed of 85 parts of amylic alcohol and 15 parts of oil of rape seed. These reagents should be made as needed and not kept on hand for any length of time.

Now, to apply the test, Professor Bechi takes 10 c.c. of the oil to be examined, adds 1 c c. of the alcoholic solution of silver nitrate and then from 8 to 10 c.c. of the mixture of amylic alcohol and oil of rape; agitating strongly and then heating on a water-bath for five or ten minutes.

In the case of pure oils, the colour remains the same as it was after the addition of the reagents. In the event that sophistication has been practised with cotton-seed oil, there will be produced a brownish colour, or turbidity, of a varying grade, from a very light brown to a deep maroon or black, according to the quantity of cotton oil present.

With these data furnished by Professor Bechi, and after having assisted in experiments made by him in support of his method, the Commission instituted a series of long and diligent personal experiments, numbering over two hundred, in the chemical, biological and hygienic laboratory of the Royal Institute; adhering strictly to the rules as laid down, measuring exactly in each instance, the quantities of oils and reagents, and using tubes of equal diameters or, in one word, employing the same conditions in all experiments, in order to render the result truly comparative.

The oils used were furnished in part by Professor Bechi and in part by this Commission; looking, especially, for those olive oils of whose genuine nature there could be no possible doubt, and then, secondly, taking good olive oil containing cotton oil. Several of the olive oils were from other countries (Spain, France, Tunis, Dalmatia, and Malta, etc.), but the greater number were from various parts of Italy. Some were recent and some old, others pure of 1*a*, 2*a*, 3*a*, quality and others were rancid.

In order to ascertain if the reaction outlined by Bechi was peculiar to cotton-seed oil addition, alone, the Commission found it necessary to extend their experiments upon other oils, vegetable and animal, alone and admixed with pure olive oil.

Every experiment made was in doubles or triples, that is two samples of the oil (marked No. 1 and No. 3), and another sample of the oil (marked No. 2), which had added to it cotton-seed oil in a certain proportion; subjecting No. 1 and No. 2 samples to the heat of boiling water, after the addition of the reagents, and leaving No. 3 sample without exposure to heat in order to com-

* Abridged from the Report of the Commission of Florence appointed to examine "Bechi's Test." See *L'Orosi*, February, 1887, p. 37. From the *American Journal of Pharmacy*, June.

pare the colours of Nos. 1 and 2 with that of No. 3. The experiments were then especially directed toward the mixture of olive oil with oil of cotton seed, The proportion used for the mixture was generally 20 per cent. of the latter oil. The Commission held that if the method of Professor Bechi will determine any such falsification it is more than sufficient for any exigency, inasmuch as the fraud practised is always in much larger proportion. The experiments were grouped under five series.

Series A.—Cotton-seed oils of various origins.

Eleven samples of oils from the following markets were used:—1, London; 2, New Orleans; 3, Augusta; 4, Louisville; 5, Sample (eight years old); 6, English (Hirsch); 7, Thorn; 8, Maginnis; 9, Planter's; 10, Aldigè; 11, Creole. All these oils treated with the "Bechi Test" gave a most intensely brownish colour, that exhibited no appreciable variation in shade, according to the origin of the product. The experiments were then repeated upon the oils, using 2 c.c. of oil of cotton to 8 c.c. of olive oil. The olive oil used was from Pons of Scandicci, upon whose genuineness there can be no question.

Series B.—Pure olive oil alone and admixed with oil of cotton.

The series of experiments here outlined were based upon the first, second, and in some instances the third quality of forty-eight oils, giving also the origin of each oil. The samples were subjected to comparative tests alone, and then admixed with 20 per cent. of Hirsch's English cotton-seed oil, the most abundant in Italian markets; in every instance the forty-eight olive oils, alone, were negatively affected by the reagents, but the instant cotton oil was admixed, and the test then applied, the result was promptly given by the formation of the deep brownish colours in every instance.

Series C.—Various oils alone or mixed with Hirsch's English cotton-seed oil.

The oils here examined are twenty-five fixed oils of different qualities, liable to be used as an adulterant. They are, for example, oils of rape (Germany, Milan, Marseilles, etc.), sesame (Levant, Georgia, Bombay, Paris and Grasse), peanuts, poppy, linseed, cocoanut, castor, almond, poach-seed and cod-liver, and the results show that in every case there was no appreciable change with the reagents, but if prior to the application to the test 20 per cent. cotton oil was added, the characteristic colour of the reduction was formed.

Series D.—Pure olive oil with other fixed oils alone, and with cotton oil.

These experiments were made to ascertain if the presence of other fixed oils than cotton seed in a mixture would have any modifying influence upon the reaction, so characteristic with oil of cotton. It is sufficient to say that the results show that they have none, and the Commission find that the test is therefore limited to that fixed oil alone. The cotton-seed oil was added in 20 per cent. proportion, when used with both oils of olive and benne (in the secondary tests), which latter two were evenly divided (*i.e.*, 40 per cent.), while the oil of sesame was added in equal parts to olive oil, prior to the application of the primary tests.

Series E.—Rape oil of different origins, alone, and mixed with cotton oil.

The Commission, in view of the importance that oil of rape obtains in the application of Bechi's test, examined seven oils of various qualities, derived from different provinces. From these experiments the assertion is made. that while several of the finest samples in the pure, undiluted state, furnished a noticeable change in the formation of a reddish-brown colour, this was always made very much darker if 20 per cent. of cotton-seed oil was previously added; and, on the other hand, if the rape oil examined was previously diluted with pure olive oil or amylic alcohol, as, for example, in the proportions used by Professor Bechi in his test, *no* change whatever was evinced.

Finally the Commission, wishing to see if a variation of the proportion of the reagents would more clearly demonstrate results, used a stronger solution of silver nitrate, and found that the brownish colour could be made to vary from brown to black, according to the quantity of the silver salt added. After numerous experiments, they decided that the original proportions were the best ones to adopt, in that the test would be much more delicate, and would not, under any circumstances, be caused by the rape oil.

To examine olive oil for admixed cotton oil, with Bechi's method, the Commission recommend the division of the suspected sample into three parts, as follows:—

No. 1. Tube of the suspected oil and reagents.

No. 2. Tube of the suspected oil and 20 per cent. of cotton oil, and the reagents.

No. 3. Tube of the suspected oil and reagents.

Now expose tubes No. 1 and No. 2 to the heat of boiling water for five or ten minutes, but do not heat tube No. 3; use it simply as a guide to see if No. 1 remains unaffected by heat or becomes coloured. If the sample is pure, the oil will remain unchanged, that is the same in appearance as No. 3, while No. 2 acquires the characteristic colour. If the oil in tube No. 1 has been sophisticated with cotton oil the brownish coloration will soon appear, while tube No. 2 will be a much deeper brown; evidently showing that the brownish colour is due in part to the quantity of cotton-seed oil present, as well as the proportion of silver nitrate and oil of rape.

From all that has been presented, and more especially from the clear, concording and uniform results obtained in the experiments herein detailed, it is evident that the method proposed by Professor Bechi, used with care, and in the manner indicated, has not failed the Commission in a single instance, and they feel that they cannot do less than to most strongly urge its general adoption as a reliable and positive indicator for the existence of cotton-seed oil in olive oil, fraudulently added.

In the original article no theory is advanced concerning the chemical reaction that takes place in the application of the "Bechi Test," but it seems highly probable that the change is due to a reduction of the silver nitrate to the state of oxide, through the presence of the peculiar yellow colouring principle present in cotton-seed oil. The product, after the testing is finished, measures 11·5 c.c., showing that the residue is simply a mixture of the suspected oil (10 c.c.) and oil of rape (15 c.c.), while the alcohols have been totally dissipated by the heat of the water-bath. The utility of the rape-seed oil in the decomposition is not explained, and whether the amylic alcohol through any chemical change exerts any influence is also an unsolved problem.

REPORT OF COMMITTEE OF INQUIRY INTO M. PASTEUR'S TREATMENT OF HYDROPHOBIA.

The following is the report of the Committee appointed by the Local Government Board, consisting of Sir James Paget (Chairman), Dr. T. Lauder Brunton, Professor George Fleming, Sir Joseph Lister, Dr. Richard Quain, Sir Henry E. Roscoe and Dr. John Burdon Sanderson, to inquire into M. Pasteur's treatment of hydrophobia:—

In accordance with the instructions contained in a letter dated April 12, 1886, from your predecessor, the Right Honourable Joseph Chamberlain, M.P., appointing us to be a Committee to inquire into M. Pasteur's treatment of hydrophobia, we beg leave to present to you the following report:—

In order to answer the several questions involved in the inquiry we found it necessary that some of the members of the Committee should, together with Mr. Victor Horsley, the Secretary, visit Paris, so as to obtain information from M. Pasteur himself, and observe his method of treatment, and investigate a considerable number of the cases of persons inoculated by him; and further, that a careful series of experiments should be made by

Mr. Horsley on the effects of such inoculation on the lower animals. The detailed facts of these observations and experiments are placed in the Appendix to this report; a summary of them, and the conclusions which we believe may be drawn from them, are given in the next following pages.

The experiments by Mr. Horsley entirely confirm M. Pasteur's discovery of a method by which animals may be protected from the infection of rabies. The general facts proved by them may be thus stated:

If a dog, or rabbit, or other animal be bitten by a rabid dog and die of rabies, a substance can be obtained from its spinal cord which, being inoculated into a healthy dog or other animal, will produce rabies similar to that which would have followed directly from the bite of a rabid animal, or differing only in that the period of incubation between the inoculation and the appearance of the characteristic symptoms of rabies may be altered.

The rabies thus transmitted by inoculation may, by similar inoculations, be transmitted through a succession of rabbits with marked increase of intensity.

But the virus in the spinal cords of rabbits that have thus died of inoculated rabies may be gradually so weakened or attenuated, by drying the cords, in the manner devised by M. Pasteur, and related in the Appendix, that after a certain number of days' drying, it may be injected into healthy rabbits or other animals without any danger of producing rabies.

And by using, on each successive day, the virus from a spinal cord dried during a period shorter than that used on the previous day, an animal may be made almost certainly secure against rabies, whether from the bite of a rabid dog or other animal, or from any method of subcutaneous inoculation.

The protection from rabies thus secured is proved by the fact that, if some animals thus protected and others not thus protected be bitten by the same rabid dog, none of the first set will die of rabies, and with rare exceptions, all of the second set will so die.

It may, hence, be deemed certain that M. Pasteur has discovered a method of protection from rabies comparable with that which vaccination affords against infection from small-pox. It would be difficult to over-estimate the importance of the discovery, whether for its practical utility or for its application in general pathology. It shows a new method of inoculation, or, as M. Pasteur sometimes calls it, of vaccination, the like of which it may become possible to employ for protection of both men and domestic animals against others of the most intense kinds of virus.

The duration of the immunity from rabies which is conferred by inoculation is not yet determined; but during the two years that have passed since it was first proved there have been no indications of its being limited.

The evidence that an animal may thus, by progressive inoculations, be protected from rabies suggested to M. Pasteur that if any animal or any person, though unprotected, were bitten by a rabid dog, the fatal influence of the virus might be prevented* by a timely series of similar progressive inoculations. He has accordingly, in the institution established by him in Paris, thus inoculated a very large number of persons believed to have been bitten by rabid animals; and we have endeavoured to ascertain with what amount of success he has done so.

The question might be answered with numerical accuracy if it were possible to ascertain the relative numbers of cases of hydrophobia occurring among persons of whom, after being similarly bitten by really rabid animals, some were and some were not inoculated. But an accurate numerical estimate of this kind is not possible. For—

1. It is often difficult, and sometimes impossible, to ascertain whether the animals by which people were bitten, and which were believed to be rabid, were really so. They may have escaped, or may have been killed at once, or may have been observed by none but persons quite incompetent to judge of their condition.

2. The probability of hydrophobia occurring in persons bitten by dogs that were certainly rabid depends very much on the number and character of the bites; whether they are on the face or hands or other naked parts; or, if they have been inflicted on parts covered with clothes, their effects may depend on the texture of the clothes, and the extent to which they are torn; and in all cases, the amount of bleeding from the wounds may affect the probability of absorption of virus.

3. In all cases the probability of infection from bites may be affected by speedy cauterizing or excision of the wounded parts, or by various washings or other methods of treatment.

4. The bites of different species of animals, and even of different dogs, are probably, for various resons, unequally dangerous. Last year, at Deptford, five children were bitten by one dog, and all died; in other cases, a dog is said to have bitten twenty persons, of whom only one died. And it is certain that the bites of rabid wolves, and probable that those of rabid cats, are far more dangerous than those of rabid dogs.

The amount of uncertainly due to these and other causes may be expressed by the fact that the percentage of deaths among persons who have been bitten by dogs believed to have been rabid, and who have not been inoculated or otherwise treated, has been in some groups of cases estimated at the rate of only 5 per cent., in others at 60 per cent., and in others at various intermediate rates. The mortality from the bites of rabid wolves, also, has been in different instances estimated at from 30 to 95 per cent.

To ascertain, as far as possible, the influence of these sources of fallacy in cases inoculated by M. Pasteur, the members of the Committee who went to Paris requested him to enable them to investigate, by personal inquiry, the cases of some of those who had been treated by him. He at once, and very courteously, assented, and the names of ninety persons were taken from his note-books. No selection was made, except that the names were taken from his earliest cases, in which the periods since inoculation were longest, and from those of persons living within reach in Paris, Lyons, and St. Etienne.

The notes made on the spot concerning all these cases are given in the Appendix, and they include, as far as was possible, the evidence whether the dogs deemed rabid were really so, the situation and kind of bites, the immediate treatment of them, the statements of medical practitioners and veterinary surgeons to whom any useful facts were known.*

Among the ninety cases there were twenty-four in which the patients were bitten on naked parts by undoubtedly rabid dogs, and the wounds were not cauterized or treated in any way likely to have prevented the action of the virus; there were thirty-one in which there was no clear evidence that the dog was rabid; others in which the bite, though inflicted by undoubtedly rabid animals, having been through clothes, may thus have been rendered harmless. Among these, therefore, it is probable that, even if they had not been inoculated, few would have died. Still, the results observed in the total of the ninety cases may justly be compared with those observed in

* The terms referring to "preventive" treatment will be used for that designed to prevent the occurrence of the disease in one already infected; those referring to "protective" treatment for that designed to protect a man or an animal from the risk of becoming infected. And it may be well to state that, though the usual custom is followed of employing the name of "hydrophobia" for the disease in men, and of "rabies" for that in animals, they are really the same disease.

* The Committee are much indebted to M. Arloing Director of the Veterinary School at Lyons; M. Savary, Veterinary Surgeon at Brie-Comte-Robert; and M. Charlois, Veterinary Surgeon at St. Etienne, for assistance in their inquiries.

large numbers of cases similar to these as regards the uncertainties of infection, but not inoculated. The estimates published as to the mortalities in such unassorted cases are, as we have said, widely various. We believe that among the ninety persons, including the twenty-four bitten on naked parts, not less than eight would have died if they had not been inoculated. At the time of the inquiry, in April and May, 1886, which was at least eighteen weeks since the treatment of the bites, not one had shown any signs of hydrophobia, nor has anyone of them since died of that disease.

Thus, the personal investigation of M. Pasteur's cases by members of the Committee was, so far as it went, entirely satisfactory, and convinced them of the perfect accuracy of his records.

After the first few months in which M. Pasteur practised his treatment, he was occasionally obliged, in order to quiet fears, to inoculate persons who believed that they had been bitten by rabid animals but could give no satisfactory evidence of it. It might, therefore, be deemed unjust to estimate the total value of his treatment in the whole of his cases as being more than is represented by the difference between the rate of mortality observed in them and the lowest rate observed in any large number of cases not inoculated. This lowest rate may be taken at 5 per cent. Between October, 1885, and the end of December, 1886, M. Pasteur inoculated 2682 persons, including 127 who went from this country. Of the whole number, at the rate of 5 per cent., at least 130 should have died. At the end of 1886, the number of deaths stated by M. Vulpian, speaking for M. Pasteur, was 31, including 7 bitten by wolves, in three of whom the symptoms of hydrophobia appeared while they were under treatment, and before the series of inoculations were complete. Since 1886 two more of those inoculated in that year have died of hydrophobia.

The number of deaths assigned by those who have sought to prove the inutility of M. Pasteur's treatment is, as nearly as we can ascertain, 40 out of the 2682; and in this number are included the seven deaths from bites by wolves, and probably not less than four in which it is doubtful whether the deaths were due to hydrophobia or to some other disease. Making fair allowance for uncertainties and for questions which cannot now be settled, we believe it sure that, excluding the deaths after bites by rabid wolves, the proportion of deaths in the 2634 persons bitten by other animals was between 1 and 1·2 per cent., a proportion far lower than the lowest estimated among those not submitted to M. Pasteur's treatment, and showing, even on this lowest estimate, the saving of not less than 100 lives.

The evidence of the utility of M. Pasteur's method, indicated by these numbers, is confirmed by the results obtained in certain groups of his cases.

Of 233 persons bitten by animals in which rabies was proved, either by inoculation from their spinal cords, or by the occurrence of rabies in other animals or in persons bitten by them, only 4 died. Without inoculation it would have been expected that at least 40 would have died.

Among 186 bitten on the head or face by animals in which rabies was proved by experimental inoculations or was observed by veterinary surgeons, only 9 died, instead of at least 40.

And of 48 bitten by rabid wolves only 9 died; while, without the preventive treatment, the mortality, according to the most probable estimates yet made, would have been nearly 30.

Between the end of last December and the end of March, M. Pasteur inoculated 509 persons bitten by animals proved to have been rabid, either by inoculation with their spinal cords, or by the deaths of some of those bitten by them, or as certified by veterinary surgeons. Only two have died, and one of these was bitten by a wolf a month before inoculation, and died after only three days' treatment. If we omit half of the cases as being too recent, the other 250 have had a mortality of less than 1 per cent., instead of 20 or 30 per cent.

It has been objected that the number treated by M. Pasteur, which, from October, 1885, to the end of 1886, included 1929 French and Algerians was much greater than could reasonably be supposed to have been bitten by rabid animals. But there had hitherto been no careful registration of such cases, and the numbers that have occurred in the present year are not less than in the same part of last year, when the alarm about hydrophobia was greatest.

From the evidence of all these facts, we think it certain that the inoculations practised by M. Pasteur on persons bitten by rabid animals have prevented the occurrence of hydrophobia in a large proportion of those who, if they had not been so inoculated, would have died of that disease. And we believe that the value of his discovery will be found much greater than can be estimated by its present utility, for it shows that it may become possible to avert by inoculation, even after infection, other diseases besides hydrophobia. Some have, indeed, thought it possible to avert small-pox by vaccinating those very recently exposed to its infection; but the evidence of this is, at the best, inconclusive; and M. Pasteur's may justly be deemed the first proved method of overtaking and suppressing by inoculation a process of specific infection. His researches have also added very largely to the knowledge of the pathology of hydrophobia, and have supplied what is of the highest practical value, namely, a sure means of determining whether an animal, which has died under suspicion of rabies, were really affected with that disease or not.

The question has been raised whether M. Pasteur's treatment can be submitted to without danger to health or life; and in answering it, it is necessary to refer to two different methods of inoculation which he has practised, and which are fully described in the Appendix.

In the first, which may be called the ordinary method, and which has been employed in the very large majority of cases, the preventive material obtained from the spinal cords of rabbits that have died of rabies derived, originally, from rabid dogs is injected under the skin, once a day for ten days, in gradually increasing strengths.

In the second or intensive method (*méthode intensive*) which M. Pasteur adopted for the treatment of cases deemed especially urgent, on account either of the number and position of the bites, or of the long time since their infliction, the injections, gradually increasing in strength, were usually made three times on each of the first three days, then once daily for a week, and then in different degrees of frequency for some days more. The highest strength of the injections used in this method was greater than the highest used in the ordinary method, and was such as, if used at first and without the previous injections of less strength, would certainly produce rabies.

By the first or ordinary method, there is no evidence or probability that anyone has been in danger of dying, or has in any degree suffered in health even for any short time. But after the intensive method, deaths have occurred under conditions which have suggested that they were due to the inoculations rather than to the infection from the rabid animal.

There is ample reason to believe that, in many of the most urgent cases, the intensive method was more efficacious than the ordinary method would have been. Thus, M. Pasteur mentions that, of nineteen Russians bitten by rabid wolves, three treated by the ordinary method died, and the remaining sixteen, treated by the intensive method, survived; and he contrasts the cases of six children, severely bitten on the face, who died after the ordinary treatment, with those of ten similarly bitten children who were treated by the intensive method, and of whom none died; and M. Vulpian reports, that of 186 persons badly bitten by animals that were most probably rabid, 50 treated by the intensive method survived, and of the remaining 136 treated by the ordinary method, 9 died.

The rate of mortality after the intensive method was not greater than that after the ordinary method; for among 624 patients thus treated, only 6 died, or, counting one doubtful case, 7. But that which excited suspicion was the manner of death in some of them; and this manner was observed in a man name Goffi, sent from England. On the 4th of last September he was severely bitten at the Brown Institution by a rabid cat to which, in spite of repeated warnings, he exposed his naked hand. Twelve wounds were inflicted. They were at once treated with pure carbolic acid, and, six hours later, he was put under the influence of chloroform at St. Thomas's Hospital, the wounded portions of skin were freely excised, and the wounds thus made were treated with carbolic acid. On the same evening he was sent to Paris, and on the following morning M. Pasteur commenced the intensive treatment, and it was continued during twenty-four days. During all this time the man was repeatedly intoxicated.* He once fell into the Seine, and while crossing the Channel on his return home he was severely chilled.

On October 10 he returned to his work, and appeared to be in his usual health; but he became unwell, with pain in the abdomen, like colic, and with pain in the back. On the 18th he had partial motor paralysis in the lower limbs, and on the 19th complete motor paralysis of these limbs and of the trunk, and partial motor paralysis of the upper limbs and face. He was taken to St. Thomas's Hospital, where he died on the 20th.

To the last he was free from all the usual symptoms of hydrophobia, and the progress of his disease and the manner of his death were so similar to those of what is described as acute ascending paralysis, or Landry's paralysis, that a verdict to this effect was given at a coroner's inquest. But the certainty that his death was due to the virus of rabies was proved by experiments by Mr. Horsley. A portion of his spinal cord was taken to provide material for inoculations, and rabbits and a dog inoculated with it died with characteristic signs of paralytic rabies, such as usually occurs in rabbits.

In most of the other cases of death after treatment by the intensive method, the symptoms have been nearly the same as those just related; but in none of them had the same test of death from hydrophobia been applied. The likeness of the symptoms to those of the form of rabies called dumb or paralytic, usually observed in rabbits, has suggested, as we have said, that the deaths were due not to the virus of the rabid dog or cat, but to that injected from the spinal cord of the rabbit. But this is far from certain. In the case of Goffi, especially, the incubation period was such as would have followed the bite of the cat, not the inoculation of highest intensity; and the incubation period in the rabbits and dog inoculated from his spinal cord were such as have been observed after similar inoculations with virus derived, not only from rabbits inoculated in series by M. Pasteur, but from a dog, a cat and a wolf that died of ordinary rabies. It may well have been, therefore, that the intensive inoculations in him and in the other persons who died after them were not themselves destructive, but that they failed to prevent the rabies which was due to the bites. They may also have modified the form in which the rabies manifested itself; giving it the characters of the paralytic rabies usual in rabbits, instead of the convulsive or violent form usually, but not always,† observed in man after bites of cats or dogs.

* Other cases as well as this, have led M. Pasteur to believe that the risk of death from hydrophobia is much increased by habits of drunkenness.

† Cases of paralytic hydrophobia have been observed, though rarely, in men bitten by rabid animals, and not treated by inoculation. It may, indeed, be suspected that at least some of the cases of "acute ascending paralysis" may have been cases of this form of hydrophobia, although in the complete absence of the usual violent symptoms, no suspicion of the source of the disease was entertained.

The question is likely to remain undecided; for to avoid the possible, however improbable, risk of his intensive treatment, M. Pasteur has greatly modified it, and even in this modified form employs it in none but the most urgent cases.

The consideration of the whole subject has naturally raised the question whether rabies and hydrophobia can be prevented in this country.

If the protection by inoculation should prove permanent the disease might be suppressed by thus inoculating all dogs; but it is not probable that such inoculation would be voluntarily adopted by all owners of dogs, or could be enforced on them.

Police regulations would suffice if they could be rigidly enforced. But to make them effective it would be necessary: (1) that they should order the destruction, under certain conditions, of all dogs having no owners and wandering in either town or country; (2) that the keeping of useless dogs should be discouraged by taxation or other means; (3) that the bringing of dogs from countries in which rabies is prevalent should be forbidden or subject to quarantine; (4) that in districts or countries in which rabies is prevalent the use of muzzles should be compulsory, and dogs out of doors, if not muzzled or led, should be taken by the police as "suspected." An exception might be made for sheep dogs and others while actually engaged in the purposes for which they are kept.

There are examples sufficient to prove that by these or similar regulations rabies, and consequently hydrophobia would be in this country "stamped out," or reduced to an amount very far less than has hitherto been known.

If it be not thus reduced it may be deemed certain that a large number of persons will every year require treatment by the method of M. Pasteur. The average annual number of deaths from hydrophobia during the ten years ending 1885 was, in all England, 43; in London alone 8·5. If, as in the estimates used for judging the utility of that method of treatment, these numbers are taken as representing only 5 per cent. of the persons bitten, the preventive treatment will be required for 860 persons in all England; for 170 in London alone. For it will not be possible to say which among the whole number bitten are not in danger of hydrophobia, and the methods of prevention by cautery, excision or other treatment cannot be depended on.

CARMINE SOLUTION.*

Mr. Joseph W. England, in a paper read before the Pennsylvania Pharmaceutical Association on "Carmine as a Colouring Agent," gives the following formula for carmine solution:—

Carmine (No. 40)	4 drachms.
Water of ammonia	3 ounces.
Glycerin	3 „
Water sufficient to make	8 „

Rub the carmine into a fine powder in a wedgewood mortar, make a paste with and dissolve in the water of ammonia, and then add, with constant trituration, the glycerin. Transfer to a porcelain capsule and heat upon a water-bath until the liquid is entirely destitute of ammoniacal odour, cool and add the water. The entire removal of the ammonia gas requires the constant stirring of the liquid with a glass rod and rather lengthy heating.

The finished product is a permanent, deep ruby-red liquid. It should develop no precipitate with mercuric chloride, indicating the absence of free ammonia gas, and on the addition of ammonium hydrate should acquire a purplish tinge.

This solution gives the true carmine colour to solutions without exhibiting the purplish tinge so characteristic of alkaline solutions.

* From the *Druggists' Circular and Chemical Gazette*, July.

The Pharmaceutical Journal.

SATURDAY, JULY 16, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SOCIETY OF CHEMICAL INDUSTRY.

AMONG the numerous peripatetic scientific and other associations that now take the field in the latter half of the year, the Society of Chemical Industry is not only about the earliest, but it is one of those presenting points of the greatest interest to the pharmacist. It is, moreover, one having a striking history that is to some extent a remarkable reflection of the enormously increased importance attached during recent years to the engrafting of science upon the technical methods of many industries. Less than seven years have elapsed since the foundation of the Society of Chemical Industry, and only six years since its first general meeting, when Sir HENRY ROSCOE in a comprehensive address described the object of the Society as being the bringing together, for interchange of opinions, of persons interested in or possessing a knowledge concerning the utilization of chemical action on a large scale, or who had charge of or were connected with large branches of industry dependent upon chemical principles. He showed that within these limits the receptive powers of the Society would be very large, and he instanced a number of industries in which the diffusion of a knowledge of the scientific principles underlying the technical methods practised in carrying them on, such as he thought could be effected by the new Society, would be of real service in enabling British manufacturers to combat the increasingly severe competition from abroad. The anticipation of Sir HENRY ROSCOE has been justified, and the fitness of the Society for survival has been manifested by the constantly increasing number of its members, until at the meeting held in Manchester on Wednesday last the Executive was able to announce that—notwithstanding the larger amount of subscription decided upon last year—the membership now exceeds that of any previous year, and is considerably over two thousand. In addition, however, to the success commanded by inherent fitness the progress of the Society has no doubt been much assisted by its good fortune in having had for its Presidents a series of able men, themselves masters in arts dependent for their successful cultivation mainly upon the correct application to them of the principles of chemical science. With Sir FREDERICK ABEL to illustrate the connection between chemical research and the art of war, a WELDON and a MUSPRATT to represent the alkali industry, and a PERKIN to speak for the modern rivals of IRIS evoked by chemical skill from the products of the distillation of coal, the Society might well command the confidence and adhesion of less distinguished experts in these and the many other industries that are based upon the application of chemical principles.

The President at the recent meeting, Mr. DAVID HOWARD, was also well qualified, both in respect to ancestry and his actual calling, to represent another branch of chemical industry, the association of the name of his firm with the manufacture of fine chemicals being now almost historic. Mr. HOWARD did not, however, follow the example of his predecessors in descanting especially in his address upon the development or innovations in the particular branch of chemical industry with which he is identified, but chose rather as a topic the scope of the Society and its operations. With the very fine collection of chemical products in the exhibition now being held in the city of Manchester, lying, as it were, within his immediate cognizance, it would not have been difficult for Mr. HOWARD to have filled up the whole of the time at his disposal with descriptions of instances of progress due to chemical discoveries during the last fifty years, but this was not the course he chose to take. Not inconsistently with the practical scope and objects of the Society, he chose rather to refer first to the purely empiric stage of production, when science had as yet no part, but when everything depended upon the following of traditional—though uncomprehended—rules and the use of individual skill. Mr. HOWARD chose to look back through the centuries for instances of marvellous excellence attained by the laborious process of unaided experience, and succeeded in showing that even under these unfavourable conditions standards of high excellence were attained; but it was not necessary to go back to Damascus blades for instances of the successful application of the "rule of thumb," since the iron puddler of this country and our own times affords a notable instance of a successful—but benighted—worker in the same metal. Indeed, Mr. HOWARD emphasized the change that has been wrought by the more extended industrial application of the principles of chemical science in very recent years by a somewhat querulous remark that the passing of the Pharmacy Act, giving to pharmacists a monopoly in the use of the name "chemist," was illustrative how little the all-embracing nature of chemistry was recognized twenty years ago. But Mr. HOWARD himself instanced the remarkable services rendered to the science of chemistry by pharmacists, and we think that even now it would be puzzling to point out any branch of applied science to which the name so peculiarly belongs as to pharmacy.

When Mr. HOWARD came to discuss the second stage of development, in which manufacturing chemistry might be said to begin, he came more fairly within the scope of the Society's aims. In an interesting manner he pointed out that whilst in many of the chemical industries advance had not yet been made beyond the point at which elementary rather than advanced science has been taken advantage of, in others all the resources of science have already been brought to bear, and further progress must be looked for in science itself before it can be expected in practice. Moreover, it was usefully pointed out that "applied chemistry" is not identical with "pure chemistry"; but that the successful practical application of chemical principles is as a rule indispensably linked with the intelligent appreciation of physical laws and the utilization of the highest engineering skill. A useful warning to the student in these days of the multiplication of scientific and technical literature was given in the caution that his greatest danger might lie in the fulness of the knowledge ready to his hand, and the risk that he might devote too much energy to the acquirement of knowledge and fall into the snare of imagining that a living dictionary of science, pure or applied, is necessarily a practical chemist. It was pointed out that a simple knowledge of theoretical—or even practical—results would never make him a practical chemist, without an actual acquaintance with the methods as well as the results of research.

In briefly alluding to some of the principal papers that have been read before the various sections of the Society of Chemical Industry during the past twelve months, Mr. HOWARD had no difficulty in demonstrating the enormous importance and interest of the subjects dealt with. Whilst speaking of the natural alkaloids he pointed out that complex as are their molecules, one of them, coniine, has been produced synthetically, and another one, codeine, partially so, but he incidentally expressed doubt whether as a rule, even when the synthetical history is worked out, the chemical manufacturer will be able to compete with the economical laboratory of nature in the production of these compounds. It was an interesting incident that the President-Elect, Professor DEWAR, was in a position to supplement, at a later stage of the meeting, the statement as to the synthesis of alkaloids, by the announcement that the synthesis of pilocarpine, the active principle of jaborandi, has within the last few days been effected by two French chemists, Messrs. HARDY and CALMELS, who divide the operation into two stages, first converting a pyridino-lactic acid into pilocarpidine, and then converting the pilocarpidine into pilocarpine. Another point enlarged upon by Mr. HOWARD was the all-pervading influence of micro-organisms in chemical and biological problems. Mr. HOWARD wound up by saying that, in his opinion, amidst much that was discouraging in the present commercial aspect of chemistry, there was no small reason for a hopeful view of the future in the evidences of increased life in chemical industries, and of sound method and good work on the part of those who conducted them. But although the progress of science might make the work easier, on the other hand a continually increasing effort was demanded to keep up to a standard that was unceasingly being raised. Nevertheless, it is for British manufacturers to show that this country is not behind other countries in intelligence and aptitude for work. In accomplishing this task the Society of Chemical Industry is no doubt destined to play a prominent part, and for this reason all interested in the advance of applied science will wish that the work in the sections may be carried on with vigour through the coming year, and that when the Society meets in Glasgow next July, under the presidency of Professor DEWAR, the Executive may be in a position to present a report in all respects as favourable as that brought before the recent meeting.

The motion for the House of Commons to go into Committee to consider the Pharmacy Acts Amendment Bill is now fixed for Tuesday next, the 19th inst.

* * *

In the latest official annual report on the Royal Botanic Gardens of Ceylon, Dr. Trimen, while referring to certain economic plants and products, states that in spite of the low prices prevailing for cinchona bark, the export from the island continues to increase, upwards of fifteen million pounds having been sent from the colony during the year 1886. The margin of profit to the producer, however, must have been very small, and, as a consequence, probably, very little fresh plantation has been carried out recently. During the same year the export of coffee sank to the lowest figure since 1846; this does not, however, appear to have been due to any further progressive diminution in the yield per acre through the leaf disease, but to the great reduction in the area under cultivation, though it is stated that coffee-growing in the island still remains a remunerative industry. On the other hand the export of tea from Ceylon has grown enormously, amounting to more than seven million pounds in the year, and the land in the island now under cultivation of tea is estimated at more than 130,000 acres. The tea cultivation appears to have been first attempted in Ceylon in 1839, when some seeds of the then recently discovered "indigenous Assam tree" were received at the Peradeniya Gardens from Dr. Wallich, the eminent Indian botanist, who was at that time at the head of the Calcutta Botanic Gardens.

* * *

We are informed that at the Thirty-fourth Grand International Exhibition of Science and Industry, which will be held in Brussels next year, it has been decided that Pharmacy shall, for the first time in such exhibitions, constitute a separate section. One feature of the exhibition is intended to be a retrospective gallery of the materials of the old alchemists, and the loan of apparatus that would be suitable for such a collection is invited. Modern pharmacy will also be illustrated in its apparatus and its products. The President of the Committee of the Sections is M. Louis Créteur, and the Secretary, M. Victor Reding.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

A meeting of the members and associates in business of the Society, residing in Scotland, was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, July 13, at twelve noon.

The chair was taken by Mr. H. Bellyse Baildon.

Apologies for absence were intimated from Messrs. J. L. Ewing, Edinburgh; and Daniel Frazer, Glasgow.

The minutes of last meeting were read and approved.

The Chairman then explained the considerations which had induced the Executive to arrange for another election at the present time, and called upon the Assistant-Secretary to read the following extract from the minutes of a meeting of Executive held on June 15 :—

"The Chairman then explained that the meeting had been called to consider the question of having another election of the Executive at the present time, the Council of the Society having expressed their opinion that the present members could not hold office after January, 1888, when the year for which they had been elected would expire.

"A discussion then took place and the general opinion was that the month of June in each year would be the most suitable time for having the election.

"It was then moved by Mr. Baildon, seconded by Mr. Watt, and unanimously agreed—

"'That the Assistant-Secretary be instructed, subject to the approval of the Chairman and Vice-Chairman, to issue nomination papers and make all necessary arrangements for an election on the earliest convenient date; and that in future the election of Executive take place in June of each year.

"'That the *ex officio* members of Executive be appointed Scrutineers of the voting papers, with power to add to their number.'"

The Chairman then stated that in accordance with the latter part of the resolution just read he had obtained the assistance of Messrs. J. L Ewing, Claud F. Henry, John Robertson and Frederick Stephenson, Edinburgh, as Scrutineers of the voting papers, and would now read the report drawn up at the meeting on the previous evening.

Scrutineers' Report.

In accordance with the decision come to by the Executive at the meeting held on Wednesday, June 15, 305 nomination papers were issued by the Assistant Secretary on June 16.

The nomination papers returned showed that forty-four members and associates in business had been nominated, of whom the following twenty-four were willing to act if elected.

1. Ainslie, William, 58, George Street, Edinburgh.
2. Boa, Peter, 119, George Street, Edinburgh.
3. Clark, William Inglis, 104, South Canongate, Edinburgh.
4. Fisher, John Hutchinson, 66, High Street, Dunfermline.
5. Foster, John, 225, Sauchiehall Street, Glasgow.
6. Fraser, Jonathan Innes, 13, Dundas Street, Edinburgh.
7. Frazer, Daniel, 127, Buchanan Street, Glasgow.
8. Gibson, Adam, Leven, Fife.
9. Gilmour, William, 11, Elm Row, Edinburgh.
10. Hardie, James Miller, 68 High Street, Dundee.
11. Kermath, William Ramsay, 78, Market Street, St. Andrews.
12. Kinninmont, Alexander, 69, South Portland Street, Glasgow.
13. Lawrence, Samuel, 101, George Street, Oban.
14. Maben, Thomas, 5, Oliver Place, Hawick.
15. Mackay, George Duncan, Canning Street, Edinburgh.
16. Mackenzie, James, 45, Forrest Road, Edinburgh.
17. Nesbit, John, 162, High Street, Portobello.
18. Paterson, James, 133, Gallowgate, Aberdeen.
19. Robertson, William, 94, High Street, Elgin.
20. Stephenson, John Bertram, 48, Frederick Street, Edinburgh.
21. Storrar, David, 228, High Street, Kirkcaldy.
22. Strachan, Alexander, 138, Rosemount Place, Aberdeen.
23. Thompson, Thomas, 35, George Street, Edinburgh.
24. Watt, James, sen., High Street, Haddington.

A voting list was accordingly drawn up, and on July 5th 305 voting papers were issued.

The Scrutineers met last night at 8 o'clock, and proceeded to examine the voting papers. The result was found to be as follows :—

Voting papers issued.	305
" " returned	151
" " informal	1

leaving 150 papers to be recorded.

The following gentlemen have a majority of votes :—

1. Ainslie, William, 58, George Street, Edinburgh.
2. Boa, Peter, 119, George Street, Edinburgh.
3. Clark, William Inglis, 104, South Canongate, Edinburgh.
4. Frazer, Daniel, 127, Buchanan Street, Glasgow.
5. Gibson, Adam, Leven, Fife.
6. Gilmour, William, 11, Elm Road, Edinburgh.
7. Hardie, James Miller, 68, High Street, Dundee.
8. Kermath, William Ramsay, 78, Market Street, St. Andrews.
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16. Storrar, David, 228, High Street, Kirkcaldy.
17. Strachan, Alexander, 138, Rosemount Place, Aberdeen.
18. Watt, James, sen., High Street, Haddington.

The voting papers and all other documents connected with the election are submitted herewith.

(Signed) H. Bellyse Baildon,
Chairman.

Mr. Fisher, Dunfermline, moved the adoption of the report, and expressed his gratification that all the members of the retiring Executive had been re-elected.

Mr. James Aitken, Edinburgh, seconded the motion, which was unanimously adopted.

The above gentlemen, together with the President of the Society (Michael Carteighe), the Vice-President of the Society (Thomas Preston Gostling), and Henry Bellyse Baildon, of Edinburgh, as *ex officio* members, will, therefore, form the Executive for 1887-8.

On the motion of the Chairman a vote of thanks was awarded to the gentlemen who had given their services as Scrutineers.

Mr. Watt, Haddington, in the course of a few remarks, expressed his gratification at and congratulated the Society on its success in the recent action against a limited liability company of unqualified persons trading as chemists and druggists. Sheriff Rutherfurd's judgment was of special interest as showing that the House of Lords case was decided on a mere technical objection, and that the present action was just carrying that decision to its logical conclusion. He trusted the Council

of the Society would be encouraged to proceed till it had been clearly established that no unqualified company or individual could evade the public safeguards provided by the Pharmacy Acts without incurring the statutory penalties.

Mr. Baildon said, with reference to the remarks of Mr. Watt, he thought that both the Society and the public were to be congratulated on the fact that they had been able to vindicate the statute. This case, he understood, had been appealed, and they might rest assured that the Society would spare neither trouble nor expense in the endeavour to have Sheriff Rutherfurd's judgment sustained in a higher court.

Some discussion then took place as to the propriety of publishing reports of the meetings of Executive, and ultimately the following resolution was proposed by Mr. Henry, seconded by Mr. Watt, and unanimously adopted :—

"That the question of publishing a general report of the meetings of the Executive of the North British Branch in the Journals be remitted to the Executive for their consideration."

Mr. Nesbit proposed a vote of thanks to the Chairman, which was awarded with acclamation, and the meeting then closed.

PRELIMINARY EXAMINATION.

Tuesday, July 12.

The following are the questions that were set for the Preliminary examination on Tuesday last :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin* :—

1. The days are calmer in summer than in winter.
2. There is no doubt that to restrain anger is most difficult.
3. Let not the citizens be moved by the arrival of the enemy.
4. The general has promised rewards to the soldiers.
5. Do you believe that pain is the greatest evil ?

II. Translate into English, either A. (Cæsar) or B. (Virgil.)

(*Candidates must not attempt both authors.*)

A. CÆSAR.

1. Quod ubi Cæsar resciit, quorum per fines *ierant*, his, uti *conquirerent*, et *reducerent*, si sibi purgati esse *vellent*, imperavit : reductos in hostium numero habuit : reliquos omnes obsidibus, armis, perfugis traditis, in deditionem *accepit*. Helvetios, Tulingos, Latobrigos in fines suos, unde erant profecti, reverti *jussit*, et quod, omnibus frugibus amissis, domi nihil erat, quo famem tolerarent, Allobrogibus imperavit, ut his frumenti copiam facerent; ipsos oppida vicosque, quos incenderant, *restituere* jussit.

2. Biduo post Ariovistus ad Cæsarem legatos mittit, velle se de his rebus quæ inter eos agi cœptæ neque perfectæ essent agere cum eo ; uti aut iterum colloquio diem constitueret, aut, si id minus vellet e suis legatis aliquem ad se mitteret. Colloquendi Cæsari causa visa non est, et eo magis quod pridie ejus diei Germani retineri non poterant, quin in nostros tela conjicerent. Legatum e suis sese magno cum periculo ad eum missurum, et hominibus feris objecturum existimabat.

Grammatical Questions.

(For those Candidates only who take Cæsar.)

1. Decline, in full, *sibi, oppida, fines suos* (Par. 1).
2. Give the principal parts of the verbs in italics (Par. 1).
3. Account for the case of *colloquio, diei, sese* ; and for the mood of *velle, vellet, conjicerent* (Par. 2).
4. Of what genders are nouns of the fourth declension ? Give any exceptions.

B. VIRGIL.

1. At pius Æneas per noctem plurima volvens,
Ut primum lux alma data est, exire locosque
Explorare novos, quas vento accesserit oras,
Qui teneant—nam inculta videt—hominesne, feræne,
Quærere constituit, sociisque exacta referre.
Classem in convexo nemorum, sub rupe cavata,
Arboribus clausam circum atque horrentibus umbris,
Occulit : ipse uno graditur comitatus Achate,
Bina manu lato crispans hastilia ferro.

2. Postquam introgressi, et coram data copia fandi,
Maximus Ilioneus placido sic pectore *cœpit :*
O regina, novam cui *condere* Jupiter urbem,
Justitiaque *dedit* gentes frenare superbas,
Troës te miseri, ventis maria omnia vecti,
Oramus : *prohibe* infandos a navibus ignes,
Parce pio generi, et propius res *aspice* nostras.
Non nos aut ferro Libycos populare Penates
Venimus, aut raptas ad litora *vertere* prædas.

Grammatical Questions.

(For those Candidates only who take Virgil.)

1. Decline, in full, *ipse, sociis, horrentibus umbris* (Par. 1).
2. Give the principal parts of the verbs in italics (Par. 2).
3. Account for the case of *noctem, volvens, Achate* ; and for the mood of *accesserit, teneant, quærere* (Par. 1).
4. Of what genders are nouns of the fourth declension ? Give any exceptions.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

1. Add together Two million three hundred and forty pence, Eight hundred and eight thousand sixpences, and Ten million one hundred and thirty-five thousand nine hundred and fifty shillings. Express the answer in pounds.
2. Add together $\frac{2}{3}$, $\frac{4}{1\,5}$, $\frac{5}{9}$, $\frac{7}{4\,5}$; and divide the result by the difference between $\frac{2}{3}$ and $\frac{4}{1\,5}$.
3. Add $\frac{2\,1}{2\,6}$ of $\frac{3\,9}{4\,9}$ of 8*s.* 2*d.* to ·0625 of £6 13*s.* 4*d.*, and express the sum as a decimal of £2 0*s.* 9*d.*
4. If the wages of 29 men for 54 days amount to £80 9*s.* 6*d.*, how many men must work 12 days to receive £407 ?
5. If 1 décalitre of wheat makes 6 kilog. 68 décag. of bread, how much wheat will be required to make 56 myriog. 1 kilog. 788 gr. of bread of the same quality ?
6. The population of a certain town is 12,175, and is 25 per cent. more than it was five years ago ; what was it then ?
7. A sum of £630 is to be divided between 10 men, 32 women, and 48 children. Each man has twice as much as a woman, and the 32 women receive as much as the 48 children. What will be the share of each person ?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following sentence :—
"In the first rank of these did stand
A man so various, that he seem'd to be
Not one, but all mankind's epitome."
2. Parse *fully* the following sentence :—
"To men
Press'd by their wants, all change is ever welcome."
3. Correct the following sentences, giving your reasons :—
(i.) The man had drank all his beer.
(ii.) He or I is sure of the prize.
(iii.) No one was thinking of it less than me.
(iv.) Who do you take him for ?
4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where requisite :—in the debates arts were practised and passions excited which are unknown to well constituted tribunals but from which no great popular assem-

bly divided into two parties ever was or ever will be free the rhetoric of one orator called forth loud cries of hear him another was coughed and scraped down a third spoke against time in order that his friends who were supping might come in to divide if the life of the most worthless man could be sported with thus was the life of the most virtuous man secure

5.* Write a short biography of some distinguished Englishman of the 18th or 19th century, *or* an account of some modern invention with which you are familiar.

* This must be attempted by every Candidate.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 6th instant, at the Society's rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The Vice-President (Mr. H. N. Draper) in the chair.

The other members of the Council present were Messrs. Wells, Begg, Grindley, Hayes, Hodgson, Brunker, and Simpson, Dr. Collins, Dr. Evans, and Professor Tichborne.

A communication was read from a country correspondent stating that in his town poisons were illegally sold in grocers' and other shops; that a pennyworth of the most deadly poison could be obtained by the youngest child without even the name of the article being written on it. The writer added that he would not have written again to the Society on the subject but for their notice which appeared on October 4, in the *Freeman's Journal.*

The Vice-President: Is the gentleman a member of the Society?

The Registrar (Mr. Ferrall): No, sir.

Mr. Hodgson: If not, I do not see that we have any right to give him any information. If he were a member of the Society we could reply, that if he guaranteed the cost of the proceedings and undertook to prove the cases, we could act, but we have no funds to institute proceedings ourselves.

Mr. Brunker: We cannot tell whether the persons named in his letter may not be entitled to sell poisons.

Mr. Hayes: I know that some of the persons mentioned have been selling poisons for thirty years.

Mr. Wells: This Society was started to put down the illegal sale of poisons, and I think we should do it.

Mr. Hodgson: Have we any member in this town who objects to what is being done?

The Registrar: I do not think we have.

Mr. Begg: But I think we should protect the public.

Mr. Wells: We have written time after time to persons who were not licentiates of this Society, but who made communications of this kind to us, stating that if they guaranteed the costs of prosecution we would act.

Mr. Hodgson: I never heard of such a principle being acted on before; and I object to it *in toto.*

Mr. Brunker: We have acted on it. The Londonderry prosecutions were instituted on the information of a licentiate apothecary who guaranteed the expense.

Mr. Hodgson: That was altogether a different thing.

Mr. Simpson said that if the police did not take action in such matters the Society should do so.

Mr. Wells: We asked the Inspector-General of Constabulary to instruct the police to do so, and he would not. We will not be carrying out the law if we decline to act in case this gentleman guarantees the costs. We should protect the public as well as ourselves.

Dr. Collins: We should take it for granted that the complainant has been selling poisons himself, and has complied with the Act of Parliament by labelling properly.

Mr. Brunker: I move—

"That be written to, to the usual effect, viz., that if he can make a good case, and guarantee all expenses, the Council will consider the advisability of undertaking a prosecution."

Mr. Hodgson: I move an amendment—

"That if be not a pharmaceutical chemist or licentiate apothecary, we can take no action against the parties named as selling poisons."

I will go further, and say, that if this matter be carried against me I shall never sit here again. There is a craving desire to prosecute people which we should not yield to.

The Vice-President: I hope we shall not lose so valuable a member as Mr. Hodgson in respect of the matter. I am also very sorry indeed that he did not make his threat after the decision instead of before it.

Mr. Begg: Is every grocer and ironmonger entitled to sell poisons?

Dr. Evans: Certainly not.

Mr. Begg said he had a chemist's establishment. There were two or three hardware merchants in the neighbourhood, and he knew that a pennyworth of corrosive sublimate wrapped up in a piece of paper without any label on it could be bought without the slightest trouble. He laid samples on the Council table some time ago, but no notice had been taken of them. They could get anything they wanted in the way of poisons there from one or two persons without the slightest let or hindrance.

Mr. Hodgson: Mr. Vice-President, I have been asked not to carry out the intention I expressed a few minutes ago, and, therefore, I withdraw what I said.

Mr. Hayes said he strongly supported Mr. Hodgson's amendment. The Society had hitherto only acted on the suggestions of pharmaceutical chemists or apothecaries who observed the law themselves with regard to the sale of poisons, and the compounding of prescriptions; and they should know that the complainant acted rightly himself before they proceeded at his request.

Mr. Hodgson said he knew as a matter of fact that some of the parties named in the letter were selling poisons at a time when some of the gentlemen who were sitting at the table had not been born.

Professor Tichborne said it would have to be ascertained whether the gentlemen named in the letter were selling drugs before the passing of the Pharmacy Act; because if they were he did not think the Society had any power to interfere with them. If not it would be right to take cognizance of what was alleged.

Mr. Simpson: There is nothing in Mr. Brunker's resolution which binds us to anything.

Mr. Brunker: Further than to inquire into the merits of the case. If the amendment should be passed it would debar the Council from taking up any case similarly circumstanced, no matter how glaring a breach of the law might have been committed. Of course after inquiries should have been made no steps would be taken unless it were found that a good case could be made and a good guarantee obtained. He did not know the writer of the letter; but it was his opinion that that Society had been established for the protection of the public. The rights of certain persons to sell poison had been safeguarded by the Act. Those who were engaged in selling poison at the time of the passing of the Act were as much protected by law as any of the licentiates of the Society; and if any one of those persons undertook to pay the expense of a prosecution it would be the bounden duty of the Council to put the law in force. His opinion was that the Council would be bound to go further than that if it had the means; but it had not the means; and it would not be right towards the future pharmacists of Ireland that the Society should expend the little means it had.

Professor Tichborne said he could not quite agree with Mr. Hodgson. The question was whether these persons were acting legally or illegally; but he thought Mr. Brunker's motion committed the Council to action rather more than was necessary. It was true that some of the parties might be selling gridirons, but they all knew that grocers had been in the habit of acting as chemists and druggists in the country for years.

Prof. Tichborne withdrew his objection to the motion.

The amendment of Mr. Hodgson was put and negatived, and Mr. Brunker's motion was put and carried.

Letters were received from a licentiate of the Society, one of which stated that he was willing to assist the Council with evidence in a prosecution, but that he declined to become responsible for expenses.

The letters were ordered to be marked read.

A letter was read from Mr. H. Anderson, manager of the International Club, 11, Harcourt Street, asking leave to use a small room in the upper part of the house, belonging to the Pharmaceutical Society.

The Registrar was directed to reply, stating that the Council preferred to retain the control of the room.

A letter was received from Mr. J. J. Ferguson, of London, forwarding some original prescriptions.

Thanks were voted to the donor.

A donation was received from the Technological Museum of Sydney, New South Wales, of a copy of their report for 1886. The Registrar was instructed to write thanking the donors, and to send them a copy of the Calendar of the Society.

Reports from the Law and the Certificates Committees were adopted.

The following gentlemen, who had been proposed by the President, and seconded by Mr. Hodgson, were elected members of the Society :—Mr. J. Horner Haslett, 14, College Gardens, Belfast; Mr. Charles John Johnson, 69, Burrin Street, Carlow; and Mr. Patrick Merrin, 12, Lower Camden Street, Dublin.

Some financial business having been disposed of, the Council adjourned.

At the July examinations for the Licence to act as a Pharmaceutical Chemist, the following passed :—Messrs. J. J. Sewell, Killarney; M. M. McKenna, Tipperary; J. B. Robinson, Belfast; P. J. Lyons, Belfast; J. A. McKee, Portarlington; J. Thompson, Coleraine. Five were rejected.

At the July Preliminary examinations the following passed :—Messrs. Stevenson, Price, Williamson, Lynass, McArdle, and Wray. Six were rejected.

Society of Chemical Industry.

SEVENTH ANNUAL MEETING.

The Seventh Annual meeting of the Society of Chemical Industry was held at Manchester, on Wednesday morning last, in the Chemical Theatre at Owens College. There was a good attendance of members. The chair was taken at eleven o'clock by the President, Mr. David Howard. After the minutes of the last annual meeting had been read and confirmed, a letter from Sir Henry Roscoe was read, expressing regret at his compulsory absence.

The Chairman then called upon the Secretary to read the Annual Report of the Council. This report, which was a brief one, commenced by stating that the number of members on the register was 2302, as compared with 2271 at the last annual meeting. During the year 213 new members had been elected, and 182 members had been removed by death, resignation and other causes, showing a net gain of 31. Having regard to the continued depression in the chemical industries, and the raising of the Society's subscription to 25*s*., this progress, though small, was thought to be a matter for congratulation. Among the members who had died during the year, the names were mentioned of Professor Ripley Nicholls of the Massachusetts Institute of Technology; Colonel Sir M. Francis Bolton; M. Emile Leroy, Director of the Alkali Department of the famous Glass Works of St. Gobain; Mr. G. T. Chinnery, killed by an explosion at the Redheugh Tar Products Works; and Mr. J. M. Roberts, of Manchester. The papers read before the various Sections had shown an increase, Manchester heading the list with 29, London 21, Glasgow 19, Liverpool 13, Newcastle 8, Nottingham 4, and Birmingham 4; making, together with three communications, a total of 101, as against 82 last year. Reference was made to the introduction into the columns of the Journal of information on foreign statistics, alterations in tariffs, customs regulations, patent laws, and new openings for trade. It was then stated that in consequence of joint representations from the Committees of the Glasgow and Manchester Sections, it had been resolved to meet in Manchester this year in order that members might have an opportunity of visiting the Royal Jubilee Exhibition, and to defer the meeting in Glasgow until next year, when there will also be an exhibition in that city. Consideration of the question of the spirit duties and their effect upon the chemical industries had been referred to the General Purposes Committee, and the Council invited members to render such assistance and information on this most important subject as would enable the Committee to effectively deal with the question. The report concluded by stating that owing to the increase in the subscription sanctioned last year, together with economy in the publication of the Journal, the finances of the Society were now in a satisfactory state.

The adoption of the report was moved and seconded by the Local Secretaries, and carried unanimously.

In the absence of Mr. E. Rider Cook, the Treasurer's report and a number of explanatory statistics were read by the Secretary. From these it was gathered that the year's income of the Society had amounted to £3791, about £3215 of which represented members' subscriptions, whilst, in respect of the Journal, £230 had been received for advertisements and £215 for numbers sold. On the other side, the principal item of expenditure was on account of the Journal, amounting to about £1750, the net result being an increase in the balance in favour of the Society of £304.

The Chairman, in referring to the fact that the chief expenditure was on account of the Journal, said the Council considered it indispensable that this work should be efficiently maintained.

Messrs. Bailey, Thompson, Benger and Batty were then requested to act as Scrutineers in examining the balloting papers for the election of officers and Council for the ensuing year, and while this was being done the President proceeded to deliver his address.

The President's Address.

The President commenced by referring to the fact that the addresses of his predecessors had been devoted to special subjects, such as explosive compounds, the alkali industry and the coal tar colours, and said that the technical qualifications of those by whom they had been delivered had enabled them to produce monographs on the respective subjects. He did not propose to follow their examples, but in what he had to say he would consider the scope of the Society and its operations. It would be difficult, he said, to avoid a certain discursiveness, with the admirable illustrations of the varied progress of chemical industry that were afforded by the Exhibition at Manchester. It was true that the last fifty years had not seen the first beginnings by any means of all the branches of the chemical industry, but there were few in which that period had not witnessed new departures of progress, which in many instances had created new industries rather than merely improvements of the old. Yet when they considered these various illustrations of the progress of applied chemistry they must at once be struck by the stages which had been attained. First of all there was the purely empiric stage, where science had no part, but where ruled supreme the art and mystery of the trade—to use a term so familiar in old time, and so expressive of the stage reached. They should not undervalue that stage. It was marked throughout by perfection of individual skill. The processes were often imperfect and wasteful, and were handed down from one to another by laborious apprenticeship, the teacher not knowing himself the secret of his own skill. Yet, for all that, the result was often all they could hope to

attain with fuller knowledge and accumulated experience. It was a true sense of the meaning of the word "art" that had led those whom they now called artists to steal the word for themselves alone, leaving those in the chemical industry, who had as much need of true art in their work, with no word to express it. That was all the more to be regretted as the alternative word "craft" had fallen as much in society as the other had risen. The mischief was done, and it was in vain for a Carlyle to tell them, however vigorously, that every worker was indeed a poet, or to bring back any other lost meaning to a word. Yet it was a great evil that they should in great measure whilst losing the word have lost sight of the importance and dignity of the art of manufacture; for, indeed, in the linking of that art to science instead of to mystery lay the true hope of advancement in their work. It was well, therefore, to bear in mind how those excellent results were attained, that they might not lose what was well worth preserving in the industry of the past, while making the fullest use of the opportunities of the present. All investigation, without science to direct its course, must in its earliest stages involve much guesswork. There were many instances in which the laborious process of unaided experience, a kind of unconscious cerebration acting on acquired knowledge, had led to correct results. The shepherd was able to prognosticate correctly respecting the weather, but would fail to give an explanation of his method of arriving at that result. The ancient belief in poisoned wells was well-founded, the failure being to recognize that they were poisoned by filth. Damascus blades and Nankin china were still standards of the respective wares. The statuary and architecture of the unscientific Greeks had never been surpassed. The second stage of development—in which the general outlines of science had been grasped, and when what were now considered the merely elementary laws of combination and substitution, of simple and double elective affinity as they were called, were placed at the service of the practical man, and when analysis had become a science and not mere guesswork—was naturally the most rapid one. From this stage manufacturing chemistry might be said to begin. Very many of the chemical industries had not advanced beyond this stage, in which elementary rather than advanced science was taken advantage of. In some instances there had been a decided check through meeting with unexpected results, as in the case of the application of chemistry to agriculture, which at first seemed so simple, but concerning which, notwithstanding the researches of Gilbert and Lawes, there was still so much uncertainty. In all these things there was evidently great scope for progress. In some, on the other hand, all the resources of science had been brought to bear, and progress must be looked for in science itself before it could be expected in practice. In urging forward, therefore, in the path of scientific industrial progress, which we were bound to do till in all branches of industry all scientific progress was fully appreciated, and while valuing most fully the advantages afforded by science, we should ever do well to avoid what was, perhaps, a natural inclination, to regard with a feeling akin to contempt the long experience treasured up in traditional rules. Exactly the same process of careful induction and verification was needed in the application of science itself. The work of the scientific chemist must never be regarded as the *terminus ad quem*, but as the *terminus a quo*, and starting therefrom they must work out for themselves the application all the more carefully if the way seemed perfectly plain. The President warned the student not to suppose that knowledge, however perfect, of theoretic results, or the practical ones either, would ever make him a practical chemist unless he had learned the methods of research as well as the results of research. The great danger of the modern student lay in the very fulness of the knowledge ready to his hand. There was no small risk that some might devote all their energies to merely acquiring knowledge, and fall into the snare of imagining that a living dictionary of science, pure or applied, was a practical chemist. Applied science would in the future gain her greatest triumph on the border land between the known and the unknown. It was important to bear in mind that knowledge that would enable a man to pass an examination might prove insufficient for research. Further, applied chemistry is not pure chemistry, but often involved a wide knowledge of physics and engineering. In the case of steel production, or the preparation of oxygen, using baryta as a conductor, success was dependent upon the use of suitable apparatus. Referring to the necessity for the establishment of such a society, he said that the name "chemist" had been made by statute law a monopoly of the followers of an important but restricted branch of the science. The passing of the Pharmacy Act was a curious proof how little the all-embracing nature of chemistry was recognized so recently as 1868. Turning to the subjects of the papers that had been read before the Society, and mentioning the lecture on alkaloids recently delivered by Dr. Armstrong, the President said that the work in the direction of the separation of the active principles of plants had been chiefly done by pharmacists, and that great progress had been made during the last fifty years. The molecular complexity of these compounds, however, rendered them very difficult to deal with. More than a qualitative knowledge of the drugs yielding them was required, since they varied greatly, and exact methods of analysis were required. Some advance had been made in the artificial production of the natural alkaloids, as in the entire synthesis of coniine and the partial synthesis of codeine. But he doubted the possibility of competing economically with nature's laboratory in this direction, and mentioned that Java cinchona barks were now received containing 10 or 12 per cent. of quinine. He then referred to the artificial alkaloids, and the importance of the group of ptomaines. The existence had been demonstrated of micro-organisms capable of transforming harmless substances into powerful poisons. In dealing with the water supply, not only the engineer and the chemist were required, but the biologist, as had been shown by the papers of Dr. Percy Frankland. Micro-organisms also played an important part in fermentation, as well, possibly, as in the fixation of nitrogen in the soil; and the practice of hurrying sewage away to the sea before it has had time to undergo change involved a reproach upon chemistry. Reference was also made to electrolytic processes, the use of the electric current in metallurgy, and the electric furnace. Turning from the past to the future, he said that amid much that was discouraging in the commercial aspect of chemistry there was no small reason for a hopeful view of the future in the evidences of increased life in their industries, and of sound method and good work on the part of those who conducted them. Yet there was no easy task before them. The progress of science no doubt made their work easier, but, on the other hand, it demanded of them continually increasing efforts to keep up to a standard that was constantly being raised to a higher level. It was for them to show that England was not behind other countries in intelligence and aptitude for work. We needed, no doubt, the technical education about which there had been so much talk, but it should be real and thorough to an extent that many who theorized about it had no idea of. Above all, they should know what they did want. He feared that in many minds there lurked an idea that the technical education of workmen would release the employers from the necessity of thinking for themselves. The education of the fingers alone would never make a musician, and unless heads of industrial concerns were willing to be so in deed as well as in name, that harmonious action on which success depended was certainly missed. Without real scientific appreciation on the part of the head, it was impossible that the

scientific training of subordinates could be of much avail. Of novel ideas there seemed no lack; it was sound application they needed. Of all that novelty, such as it was, no small portion was ever heard of again. It was surely rather to the practical working out of ideas that they should look for progress than to mere fertility of invention, although there might be like abundance, as of seeds in nature which yet could never come to maturity without the seed bed and the farmer's fostering care.

Professor Dewar moved a vote of thanks to the Chairman for the care and attention he had bestowed on the Society during his year of office, and for the excellent address he had just delivered. He was thankful to the Chairman for his remarks in regard to chemical art, and he hoped their pride in it would be maintained. Respecting the work of the Society, he would venture to say that if they took some of the papers which had been contributed as illustrating inductive reasoning, he knew of nothing he could place his fingers on which could be more calculated to bring the subject better before a student. Alluding to the mention by the President of the synthesis of coniine, he made the interesting announcement that intelligence had just been received of the complete synthesis of pilocarpine, the alkaloid of jaborandi, by two French chemists.

Mr. Carey seconded the motion, which was carried.

The President then read the report of the Scrutineers and declared the following gentlemen to constitute the Officers and Council of the Society for the year.

President.—Professor James Dewar, F.R.S.

Vice-Presidents.—Professor F. Clowes, D.Sc., J. Neilson Cuthbertson, David Howard, Dr. Ferdinand Hurter, Ivan Levinstein, E. K. Muspratt, Dr. W. H. Perkin, F.R.S., Sir H. E. Roscoe, M.P., F.R.S., John Spiller, Professor W. A. Tilden, F.R.S., John Williams, Philip J. Worsley.

Members of Council.—John Calderwood, F.R.S.E., Eustace Carey, R. Forbes Carpenter, James Duncan, Dr. John Evans, F.R.S., S. H. Johnson, John Pattinson, B. S. Proctor, F. J. Rowan, Dr. Edward Schunck, F.R.S., T. W. Stuart, Lewis T. Wright.

Treasurer.—E. Rider Cook.

Foreign Secretary.—Ludwig Mond.

Votes of thanks were also passed to the Treasurer and Officers of the Society, and to the authorities of Owens College for the use of the theatre.

The Annual Dinner.

In the evening the members of the Society dined in the Palm House, at the Exhibition.

Mr. D. Howard, the President, occupied the chair, and proposed the health of "The Queen and the Royal Family."

Mr. J. T. Brunner proposed the toast of "The Society of Chemical Industry."

Professor Dewar, the President-elect, in responding, said he regarded his election as a recognition of the recondite side of chemical science. And this was fitting enough, for the Society was founded to combine all classes of chemists, and to obtain the mutual benefit of manufacturing knowledge on the one hand and abstract knowledge on the other. Honours, he remarked, had not of late been widely distributed in scientific ranks, but the Society could congratulate itself that one member of its Council —Sir W. Doulton—has recently been knighted.

Dr. D. B. Hewett proposed the health of the President, to which Mr. Howard replied.

Mr. T. Tyrer proposed "The Local Section," to which toast Mr. J. Carter Bell responded.

"The Officers of the Society" was proposed by the President, and responded to by the Secretary and the Editor of the Journal.

Special arrangements had been made enabling the members to visit several important factories in Manchester and its neighbourhood, as well as for excursions on Thursday and Friday.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, June 16. Mr. William Crookes, F.R.S., President, in the chair.

The following papers were read:—

A Study of the Thermal Properties of a Mixture of Ethyl Alcohol and Ethyl Oxide. By William Ramsay, Ph.D., and Sydney Young, D.Sc.—The authors have previously shown that for both the gaseous and the liquid states, the relation of pressures to temperatures at constant volume may, in the case of methyl and ethyl alcohols, ethyl oxide and carbon dioxide, and presumably in the case of all stable liquids, be expressed by the formula $p = bt - a$; *i.e.*, the isochoric lines, or lines of equal volume, for unit mass of the substance, are straight when mapped against pressures as ordinates and temperatures as abscissæ. They also showed that in the case of the two dissociating substances, acetic acid and nitric peroxide, such isochoric lines are not straight, but are, at large volumes, tangential to the theoretical isochoric lines of minimum density at higher temperatures, and at lower temperatures probably tangential to the theoretical isochoric lines of maximum density. A comparison of the behaviour of such stable and dissociable substances has shown the effect of chemical union on the relations of pressure, temperature and volume. But the mixture of two liquids, such as alcohol and water, is known frequently to be accompanied by contraction and by evolution of heat. It therefore appeared of interest to thoroughly investigate the behaviour of such a mixture in order to throw light on the nature of this attraction. Experiments were made with a view to determining the relations of volume, pressure and temperature between wide limits with a mixture of alcohol and ether, of which, individually, the constants have already been obtained. The most striking conclusions are (1) the dependence of pressure during condensation on volume, so that the vapour-pressures are represented not by a line but by a band; (2) the curvature of the isochoric lines at temperatures and pressures near the condensing points of the mixture; (3) the great alteration of volume under certain conditions on mixing the two bodies, amounting on the one hand, in some circumstances to a contraction of 4 per cent., and in others to an expansion of 115 per cent.

Professor Dewar said that in dealing with the historical part of the subject the authors of the paper had, in his opinion, omitted to do full justice to the work of Amagat and other investigators. A short time ago, Messrs. Ramsay and Young had communicated a paper to the Royal Society, entitled "A Preliminary Note on the Continuity of the Liquid and Gaseous States of Matter," which had been referred to that evening, purporting to contain a discovery which was nothing more than a simple elementary deduction from Van der Waals' formulæ representing the continuity of the gaseous and liquid states of matter. The Van der Waals formula had been improved upon by Clausius; in its original form, however, it was still sufficient to account for Andrew's isothermal law and Amagat's law of the limiting volume of a gas under high pressure: two of the most important experimental deductions from a vast number of observations. Professor Amagat, in continuing his work, had discarded all antecedent theoretical views, and had confined his attention to the approximate laws he could deduce from the experimental facts. He had long ago given the equation that Messrs. Ramsay and Young evidently thought important enough to embody in the form of a paper. In dealing with this subject the mass of calculations made by the authors may satisfy some views, but real progress in this department of physico-chemical inquiry can only be made by reaching greater accuracy in the measurements; always

assuming that the substances examined are pure. Endless repetitions of details can only cumber the ground, not clear it. The experiments on the critical volume of PH_4Cl, to which Dr. Young referred, were in reality made by a pupil of the speaker (Mr. Skinner), and had already been published.

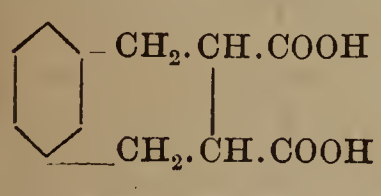
Dr. Young, in reply, said that the work of Amagat and others was referred to in the paper, but owing to the short time at his disposal he had been unable to do full justice to the history of the subject that evening. Although Van der Waals' formula could be converted into theirs, the converse was not the case; moreover, Van der Waals' formula did not represent the facts.

Derivatives of Hydrindonaphthene and Tetrahydronaphthalene. By W. H. PERKIN, Jun., Ph.D. The author describes experiments which have enabled him to prepare from *ortho*xylene derivatives of the closed chain hydrocarbons

$$C_6H_4\begin{<}\begin{matrix}CH_2\\CH_2\end{matrix}\end{>}CH_2 \quad \text{and} \quad C_6H_4\begin{<}\begin{matrix}CH_2.CH_2\\CH_2.CH_2\end{matrix}\end{>}$$

Hydrindonaphthene. Tetrahydronaphthalene.

The Synthetical Formation of Closed Carbon Chains in the Aromatic Series. By F. S. KIPPING, B.Sc., Ph.D.—The author describes experiments which were instituted with the object of ascertaining whether it would be possible, by substituting meta- and para-xylene for ortho-xylene, to obtain isomeric tetrahydronaphthalene derivatives of the formulæ—



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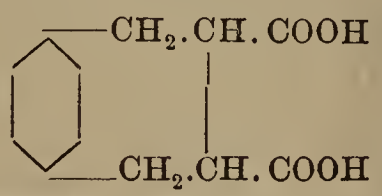

The method of procedure was the same as that described in the previous paper. Meta- and para-xylylene dibromides were each treated with ethylic sodiochloromalonate, the product was reduced with zinc-dust and acetic acid, and the reduction product was converted into the sodium derivative, which was treated with bromine. The reaction appeared to take place with perfect regularity, sodium bromide separating, but on examination it was found that the greater part of the product consisted of the unchanged substance, and no new closed chain compound could be detected. It is difficult to understand what really takes place in these reactions, or what the precise action of the bromine on the sodium compound is.

The Product of the Action of Ethylene Bromide on Ethylic Acetosodacetate. By P. C. FREER, Ph.D., and W. H. PERKIN, Jun., Ph.D.

Derivatives of Pentamethylene. By H. G. COLMAN, B.Sc., and W. H. PERKIN, Jun., Ph.D.

The Synthesis of Hexamethylene-derivatives. By P. C. FREER, Ph.D., and W. H. PERKIN, Jun., Ph.D.

An Attempt to Synthesise Heptamethylene-derivatives. By P. C. FREER, Ph.D., and W. H. PERKIN, Jun., Ph.D.

The Composition of Shale-spirit. By A. K. MILLER, Ph. D., and T. BAKER, B.Sc.—The authors have sought to determine (*a*) whether shale-spirit contains any higher olefines than those found in the liquid mixture of hydrocarbons from oil-gas, and (*b*) the constitution of the olefines, Armstrong and Miller having shown that heptylene was the highest hydrocarbon of the C_nH_{2n} series present in oil-gas products, and that all the olefines from oil-gas possess a normal constitution. The shale-spirit was fractionally distilled, and the three fractions boiling respectively at 140—145°, 120—125°, and 75—85°, were examined by the method described by Armstrong and Miller (*Chem. Soc. Trans.*, 1886, 74). Each fraction was found to consist of paraffin to the extent of about 50 per cent., the remainder being partly olefine and partly less unsaturated hydrocarbons of unknown constitution. The bromine addition-compounds of the latter are to a large extent decomposed by distillation in a current of steam, yielding tarry products, whilst the olefine bromides distil over unchanged. After distilling the bromides under reduced pressure, the olefines were recovered by the zinc-copper couple; they were then fractioned; and finally the fatty acids produced by their oxidation with potassium permanganate were examined. The results obtained show that not only the lower olefines, but also octylene and nonylene are present in shale-spirit. The nonylene was readily obtained in a state of comparative purity, and its oxidation products indicated it to be the pure normal olefine, heptylethylene. The lower olefines were, however, more difficult to purify, and gave a more complex mixture of oxidation-products. The octylene fraction (b. p. 120—122°), for instance, gave both heptylic and caprioc acids (the latter in larger quantity), together with acetic and formic acids; and in the same way the hexylene fraction (65—70°) was found to yield more butyric than valeric acid, these being also accompanied by formic and acetic acids. In the same way as the production of heptylic and formic acids indicates the presence of normal octylene, the formation of caproic and acetic acids might be regarded as evidence that an isomeric octylene is also present; but this is not necessarily the case, as acetic acid appears to be a constant product of the oxidation of normal olefines; so that no definite conclusion can be drawn from its presence, especially as it is produced to a relatively small extent; in fact, the authors consider that the caproic acid probably owes its origin to the presence of heptylene in the octylene, the separation of the lower olefines by fractional distillation being accomplished with difficulty unless very large quantities of material are dealt with. It is noteworthy that whereas in the manufacture of oil-gas the paraffins are all but destroyed, and no olefine higher than heptylene is obtained, shale-spirit, which is produced by the docomposition of paraffins at a much lower temperature, is rich in paraffins and higher olefines.

The Magnetic Rotatory Power of the Ethyl Salts of Maleic and Citraconic Acids and their Isomers. By W. H. PERKIN, Ph.D., F.R.S.

The Temperatures at which various Sulphates undergo Decomposition. By G. H. BAILEY, D.Sc., the Owens College.—On account of the use which is frequently made of sulphates in atomic weight determinations, it is important to ascertain to what temperature they can be heated without undergoing decomposition, as it is necessary to apply heat in order to dehydrate and expel adherent acid. The author heats the sulphate containing excess of acid, in the apparatus which he has previously described, at a known temperature—say 360°—till of constant weight; the temperature is then raised, and the heating continued, etc. For a considerable range of temperature the weight remains constant, but a point is ultimately reached at which further loss of weight occurs, indicating that the temperature has been reached at which the normal sulphate decomposes. Zinc sulphate begins to decompose at 410°, bismuth sulphate at 405°; lead, magnesium and sodium sulphates are stable up to 500° at least. The behaviour of didymium sulphate is quite different from that of the other salts, and the limits of temperature within which it is stable are not sharply defined.

The Reaction between Sulphites and Nitrites of Metals other than Potassium. By EDWARD DIVERS, M.D., F.R.S., and TAMEMASA HAGA, F.C.S.—Referring to a recent paper by Raschig (*Ber.*, 1887, 584), the authors state that they have for a long time been aware that hydroxylamine is producible from various nitrites by the action of sulphurous acid and sulphites, and have only delayed making this known that they might at the same time communicate the results of their examination of the stages of the reaction when sodium salts are used. Fremy entirely failed to prepare sodium salts corresponding with the potassium compounds he has described. The authors, however, have succeeded in preparing sodium salts which are unmistakably compounds of the simpler acids of which Fremy prepared potassium salts. On mixing solutions of sodium sulphite and nitrite slight heat is deve-

loped (when metasulphite is substituted the rise in temperature is more marked), and the mixture increases in alkalinity; when two formula weights of sulphite to one of nitrite are taken, all sulphite and nitrite, as nearly as possible, cease to exist as such, in about ten days' time. For some time after mixing sulphite can be precipitated as barium salt, nitrite being left in solution; but when the interaction is complete, the barium precipitate is that of a hydroxylamine-sulphonate free from sulphite and sulphate (traces excepted), and the mother-liquor contains a barium aminesulphonate and very little hydroxylaminesulphonate. On dissolving the barium precipitate in acid, no evidence of the presence of hydroxylamine is obtained until the liquid has been heated: a precipitate of barium sulphate is then produced, much hydroxylamine being then formed. The barium precipitate is probably the slightly soluble salt of hydroxylamine-disulphonic acid, and the soluble barium salt, that of aminetrisulphonic acid, which on heating becomes di- and mono-sulphonic acids, sulphuric acid separating. By acidifying and heating a mixture of sodium sulphite and nitrite in suitable proportions, the authors have obtained almost all the nitrogen of the nitrite as hydroxylammonium sulphate. Metasulphite appears to be still better suited than the normal sulphite for the preparation of hydroxylamine.

The Action of Acetyl Chloride on Acetoximes. By Victor Meyer and A. W. Warrington, B.Sc.

Sulphinic Compounds of Carbamide and Thiocarbamide. By George McGowan.

Anacardic Acid. By Dr. S. Ruhemann and S. Skinner, B.A.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, July 7, to receive the following annual report of the Executive Committee:—

Annual Report.

The Executive Committee of the School of Pharmacy Students' Association have held four meetings for the transaction of the business of the session.

At a meeting held November 16, 1886, the Secretary reported that nomination papers had been printed at the commencement of the session and forwarded to all members who had previously paid their annual subscriptions.

At the same meeting the following gentlemen were appointed as a Committee of Reporters, to report upon the progress made in the various branches of science allied to pharmacy:—"Pharmacology," Mr. R. A. Cripps; "Practical Pharmacy," Mr. F. C. J. Bird; "Botany," Mr. E. G. Baker; "Materia Medica," Mr. E. H. Farr; "Physics," Mr. F. J. Yeatman; "Organic Chemistry," Mr. W. H. Ince; "Inorganic Chemistry," Mr. L. W. Hawkins; "Analytical Chemistry," Mr. J. G. Tingle. It was also resolved by the Committee that the papers and reports read before the Association should be copied in type instead of in manuscript, before being bound for presentation to the Library of the Pharmaceutical Society; the result has been very satisfactory, the extra cost being more than compensated by the improved appearance and greater legibility of the volume.

At a meeting held March 17, 1887, a grant of 7*s.* from the Research Fund was made to Mr. E. White to defray the expenses of his paper on "Jalapin and Jalap Resin of Commerce"; the resignation of Mr. E. H. Farr, the Reporter on Materia Medica, was also received by the Committee.

At a meeting held May 5, 1887, a grant of 11*s.* 6*d.* was made to Mr. A. Smith to defray the cost of an "Investigation of the Officinal Succi," and a grant of £1 to Mr. R. A. Cripps towards a research on the "Assay of Conium and its Preparations."

At a meeting held July 7, 1887, the following statement of the Committee of Reporters was read by the Secretary on behalf of the Committee:—

"The Committee of Reporters on Science have since their appointment in November, 1886, held two meetings for the transaction of business.

"At a meeting held December 9, 1886, the order of reports for the ensuing session was arranged; the following are the reports that have been made by the members of the Committee during the session:—Report on Pharmacology, by Mr. R. A. Cripps: 'Estimation of Alkaloid in Conium Maculatum'; Report on Practical Pharmacy, by Mr. F. C. J. Bird: 'Spirit of Wine and its Strength'; Two Reports on Botany, by Mr. E. G. Baker: 'The Formation of Organic Acids in Plants,' and 'Transitions between the different Orders of Petaloideæ'; Report on Materia Medica, by Mr. E. H. Farr: 'Note on Liquor Strychninæ, B.P., 1885'; Report on Physics, by Mr. F. J. Yeatman: 'Magneto-electric and Dynamo-electric Machines'; Report on Organic Chemistry, by Mr. W. H. Ince: 'A New Method of Applying the Ferric Chloride Test to Organic Substances'; Two Reports on Inorganic Chemistry, by Mr. L. W. Hawkins: 'Yellow Mercuric Oxide,' and 'The Strength of some Official Preparations'; Two Reports on Analytical Chemistry, by Mr. J. G. Tingle: 'On Various Recently Proposed Tests.'"

This statement was approved by your Committee.

The following statistics show the progress of the Association during the session:—

The number of members on the books is seventy-one, an increase of eight on last session; fourteen meetings have been held, including to-night's annual meeting, and the gross attendance at these meetings has been 230, or an average of between sixteen and seventeen at each meeting; these figures show a slight increase on last session.

The number of communications read has been twenty-four, viz., eleven reports already mentioned, and thirteen papers; the following is a list of the papers:—"Introductory Address," by S. R. Atkins, Esq.; "Discussion on the Pharmacopœia," by Messrs. E. G. Baker and W. F. Southall; "Examination of the Fruits of Erythroxylon Coca for Cocaine," by Mr. E. J. Millard; "Nitrification, or the natural formation of Nitrates," by Miss E. A. Munro; "Commercial Jalapin and Jalap Resin," by Mr. E. White; "Examination of Commercial Specimens of Oil of Theobroma," by Mr. E. H. Barritt; "Atoms," by Mr. W. H. Ince; "Common Difficulties in the Study of Chemistry," by Mr. F. W. Short; "The Officinal Succi," by Mr. A. Smith; "Quantitative Application of the Reaction between Nitrates and Ammonium Salts," by Miss M. E. Buchanan; "Butyl Chloral Hydrate," by Mr. J. J. Thomas; "Turpentine and other Terpenes," by Mr. E. Young; "Note on a Specimen of Green Olive Oil, and a ready Test for Copper therein," by Mr. J. O. Braithwaite.

Eight of these papers and four reports have been published in full by the Editor of the *Pharmaceutical Journal*, as well as abstracts of all the others.

The Treasurer's accounts, to be presently audited, show that the receipts have been £19 3*s.* 6*d.*, and the working expenditure £9 5*s.* 3*d.*, leaving £9 18*s.* 3*d.* to be added to the Research Fund, from which grants to the amount of £1 18*s.* 6*d.* have been made during the session; the balance therefore now amounts to £21 0*s.* 9½*d.*

Messrs. E. Young and T. E. Beach were then appointed to audit the Treasurer's accounts, which they reported correct.

The President then moved the adoption of the report, which was seconded by Mr. Averill and carried unanimously.

The meeting terminated with votes of thanks to the President and the other officers, proposed by Mr. Poole, and carried with acclamation.

Communications, Letters, etc., have been received from Messrs. Haydon, Harvie, Crow, Leigh, Symes, Pollard, Thompson, Kendall, Chemicus, E. J. C., M. D. X.

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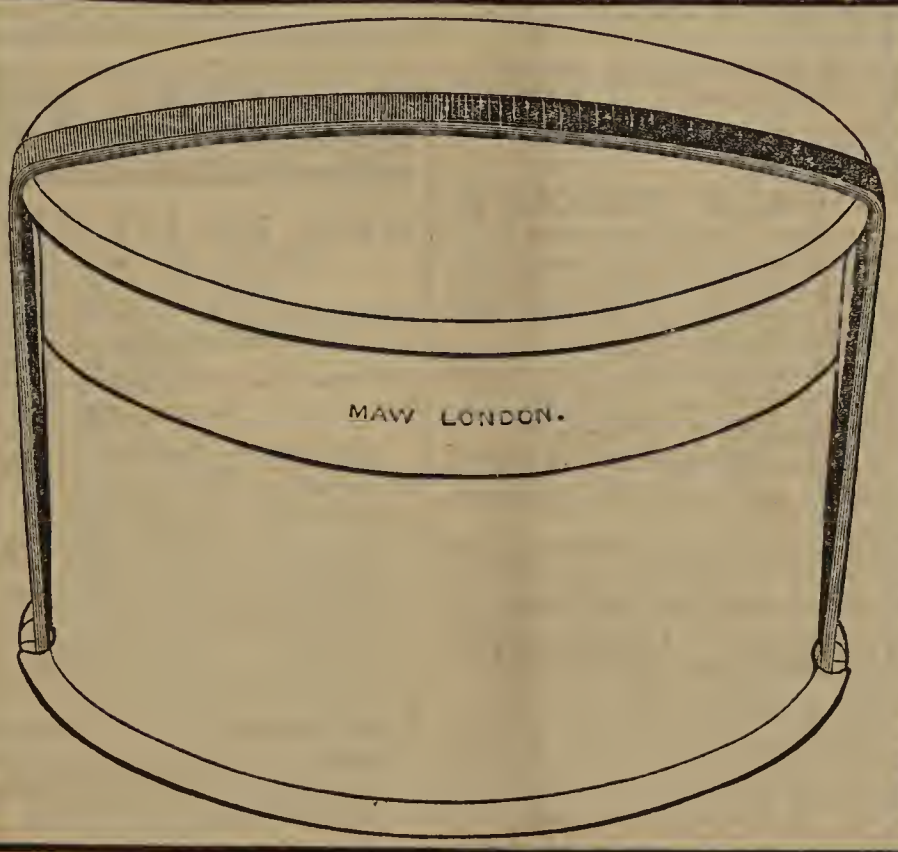

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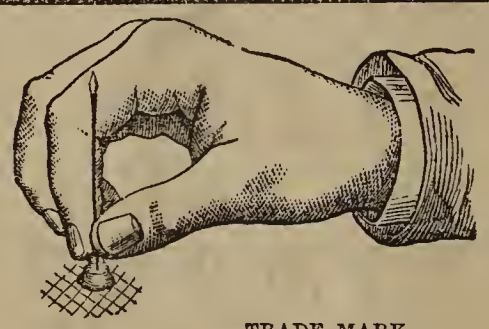

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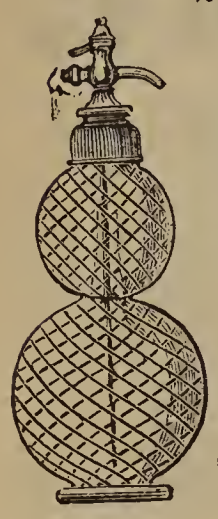

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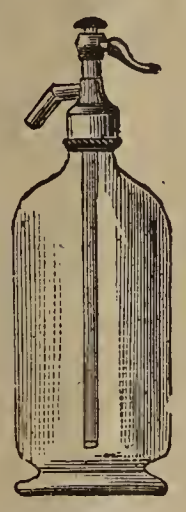

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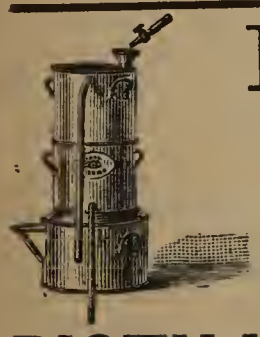

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India Office, 9th July, 1887.

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(Signed) ALLEN JOHNSON, Lieutenant-General,
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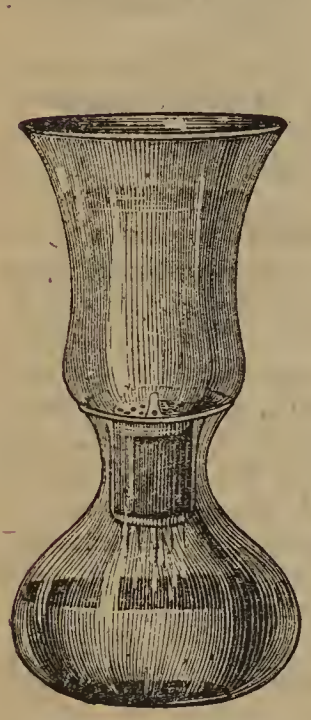

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

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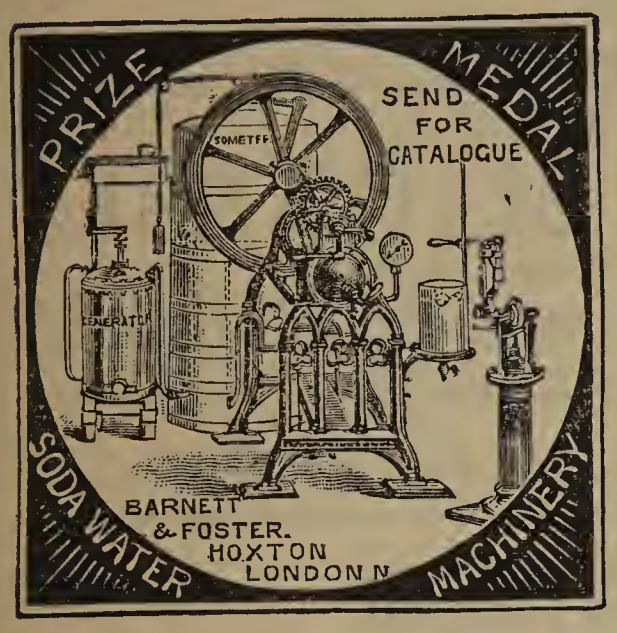

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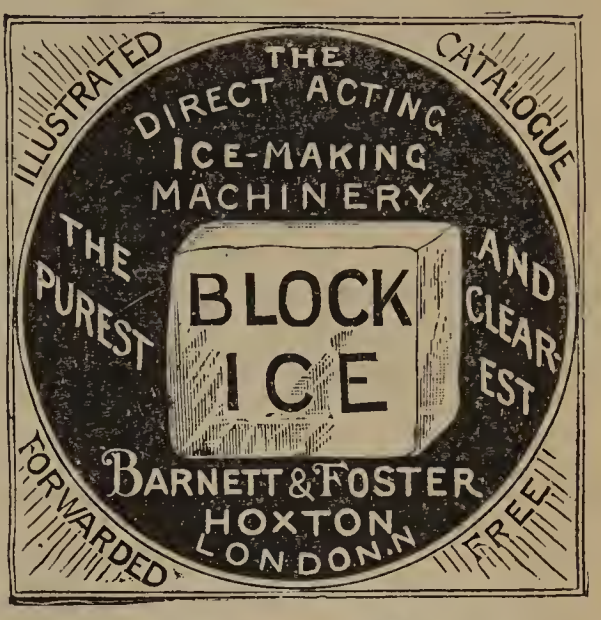

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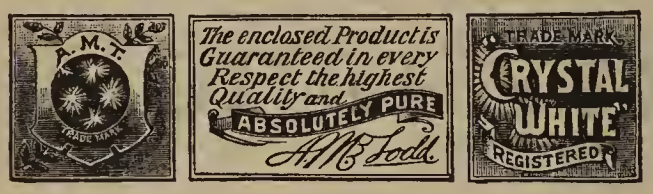

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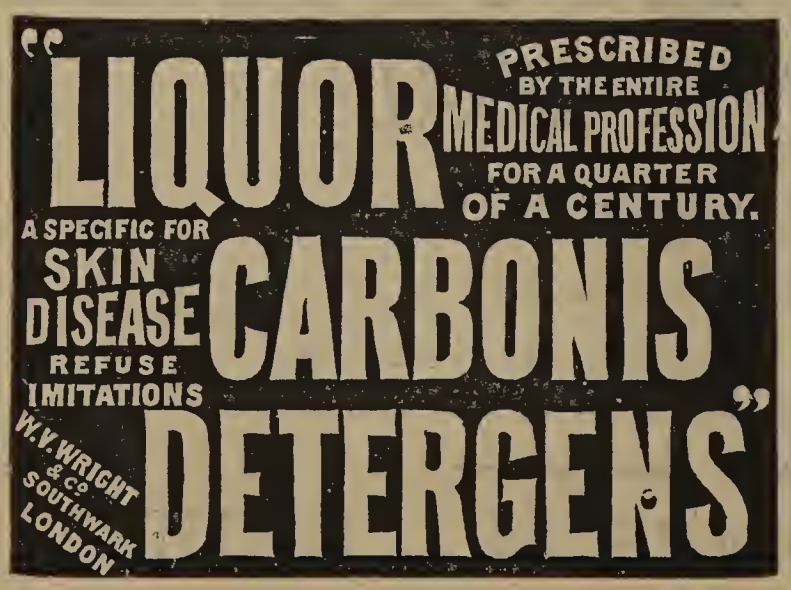

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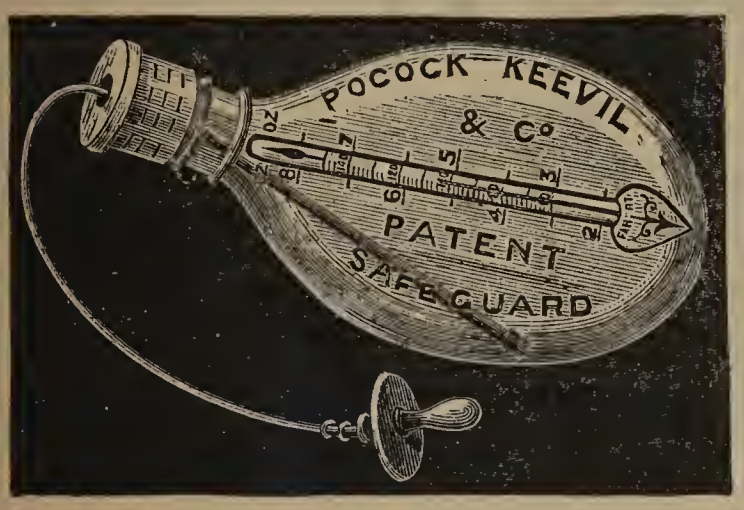

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FOR THE MANUFACTURE OF THE FINEST AERATED HOP ALE,
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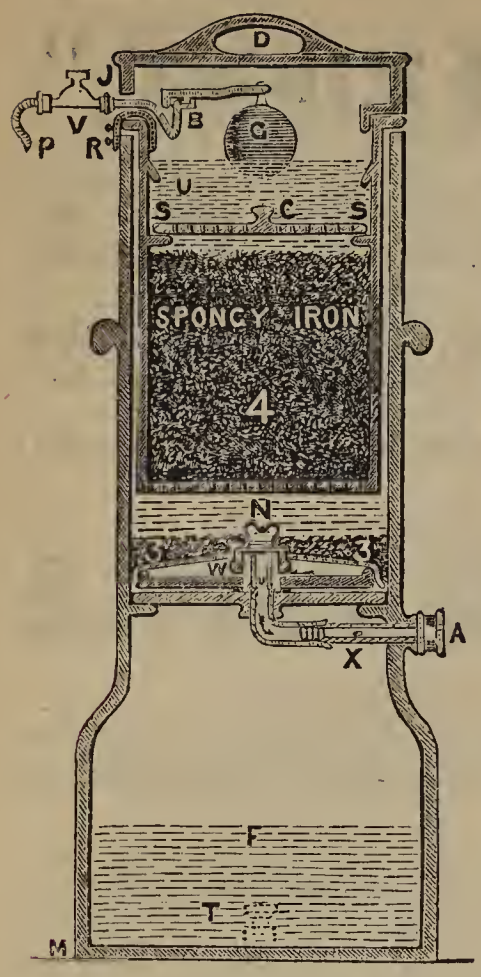

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NOTE ON THE CHEMISTRY OF STROPHANTHIN.*

BY T. R. FRASER, M.D., F.R.S.

Since former communications on the chemistry of *Strophanthus hispidus*, Professor Fraser has completed a systematic examination of various parts of the plant, more particularly of the seeds. Reserving a detailed description, a few of the results are now briefly stated. The active principle occurs most abundantly in the seeds. The body obtained by treating the alcoholic extract with ether, as described some years ago, possesses great pharmacological activity, and has the characteristics of a glucoside. In some subsequent experiments however, although the same process was followed, a well-marked crystalline product was not always obtained, and it then became evident that the difference was due to some variation in the seeds operated on. It was also found that the body obtained by the process formerly described, whether in well-defined crystals or not, was resolvable by acetate of lead into at least two bodies, one of which is an extremely active glucoside and the other an acid for which the name *kombic acid* is suggested. It being apparent, therefore, that the strophanthin first described is not a simple substance, attempts were made to improve the process so as to separate strophanthin in its pure state. The following is the process ultimately adopted. Starting with the product obtained in the earlier process, it is dissolved in water, tannic acid is added, and the tannate digested with recently precipitated oxide of lead. Rectified and proof spirit are now used to extract, and the extract obtained is dissolved in a small quantity of rectified spirit, and the solution precipitated by ether. The precipitate is finally dissolved in weak alcohol, and through this solution carbonic anhydride is passed for several hours, by which means lead is completely got rid of. After filtration the solution is evaporated at a low temperature and dried *in vacuo* over sulphuric acid.

Strophanthin thus obtained is imperfectly crystallized, neutral in reaction, intensely bitter, freely soluble in water, less so in rectified spirit, and nearly insoluble in ether and chloroform. It burns without residue, and contains no nitrogen. The per centage composition from the average of several closely agreeing results was found to be—

$$C=55{\cdot}97,\ H=7{\cdot}75,\ O=36{\cdot}28,$$

which agrees fairly with the formula $C_{20}H_{34}O_{10}$.

Strong sulphuric acid produces with strophanthin a bright green colour, which soon becomes greenish-yellow and brown. Sulphuric acid and potassic bichromate give a blue colour in addition to the coloration caused by the acid alone. Phosphomolybdic acid produces a bluish-green colour, which on addition of water becomes pure blue. With a 1 per cent. solution in water, phosphomolybdic acid causes slowly a bright bluish-green colour. Tannic acid produces an abundant white precipitate, soluble both in excess of the acid and of strophanthin. The solution is not changed in appearance by acetate or subacetate of lead, platinic chloride, ferric chloride or mercuric chloride. Nearly all acid reagents cause the solution to become hazy, and it is then found that the solution contains glucose. This decomposition is also produced by sulphuretted hydrogen, especially in the heat, and for this reason it is not advisable to use sulphuretted hydrogen in any process for preparing strophanthin.

Indeed, all the mineral acids, except carbonic, and many of the organic acids, resolve strophanthin, even in the cold, into glucose and a substance which the author names strophanthidin. A very pretty crystallization of the latter may be obtained in a few hours, when strophanthin is dissolved in a 1·5 per cent. solution of sulphuric acid. When strophanthin was decomposed at the ordinary temperature by contact for four days with 1·5 per cent. sulphuric acid, there were obtained 37·5 per cent. of strophanthidin in crystals, and about 20 per cent. of glucose, but the estimation of the latter with Fehling's solution is uncertain on account of the green coloration developed in the fluid. The strophanthidin having been removed by filtration, and the almost colourless bitter and acid liquid having been boiled for four hours, it was now found that the glucose had increased to 26·64 per cent. and that about 4·3 per cent of an amorphous substance had been formed.

This action of acids renders it apparent that an acid and especially a mineral acid, should not be used in the preparation of strophanthin. Thus in 1877, some years after the author's first communication on the subject, Hardy and Gallois described a process in which by using, for the extraction of the seeds, rectified spirit acidified with hydrochloric acid, they obtained a crystalline product which they believed to be strophanthin. There can be little doubt, however, that their product was strophanthidin, not only because the process employed would decompose the strophanthin into strophanthidin and glucose, but also because their crystallized product was found not to yield glucose when heated with dilute sulphuric acid. Hence they conclude that strophanthin is not a glucoside.* The glucosidal character of strophanthin has now been amply demonstrated from many experiments made by Professor Fraser, and by subsequent observers, especially by A. W. Gerrard.† The glucose was not only determined by Fehling's solution but also by fermentation with yeast.

* Abstract of Note read before Royal Society of Edinburgh, July 15, 1887.

THE CONSTITUTION OF URIC ACID.

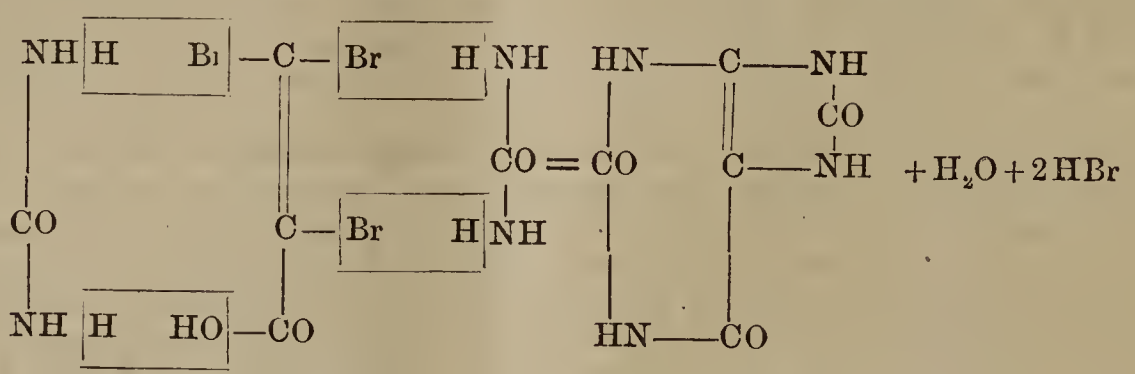
From time to time occasion has been taken in this Journal to allude to the progress which has been made towards a knowledge of the constitution of uric acid. In discussing the formation, by Horbaczewski (*Pharm. Journ.*, [3], xv., 119), of uric acid through the interaction of urea and glycine at a high temperature, it was pointed out that this "synthesis" throws but little new light on the nature of the compound, although its production by this means is in no way inconsistent with that view of its constitution which is expressed by the formula proposed by Medicus, a formula which, as was then observed, possesses a high degree of probability, since it summarizes many important reactions of uric acid. Later (*Pharm. Journ.*, [3], xv., 411), an account was given of the brilliant researches of Emil Fischer on the constitution of the acid, as well as of xanthine, theobromine and caffeine, which researches resulted in

* *Journ. de Pharm.*, xxv., 177.
† *Pharm. Journ.*, May 14, 1887.

the discovery of a nucleus common to all these compounds. Fischer successfuliy employed the formula of Medicus to explain the existence and reactions of the isomeric methyl-uric acids, and thus afforded further justification for the assumption that the molecule of uric acid contains two residues of urea $CO(NH)_2$ conjugated with a tri-carbon nucleus, in which two of the carbon atoms are probably "doubly-linked," while to the third an atom of oxygen is attached constituting the radical carbonyl, $C=C-CO$.

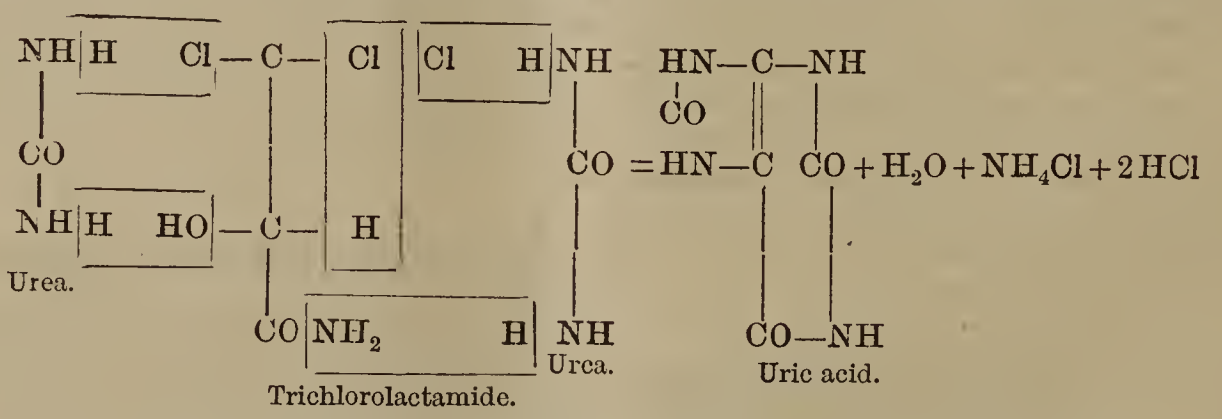
The classical researches of Strecker and Baeyer had led to the view that this tri-carbon nucleus is derived from malonic or tartronic acid, and uric acid for this reason is frequently described as the di-ureide of tartronic acid. This was however only regarded as a provisional hypothesis, for not only had all attempts to prepare uric acid from tartronic acid failed, but neither tartronic nor malonic acids had been obtained as products resulting from the direct decomposition of uric acid, although Baeyer had shown that these acids could be indirectly formed from certain decomposition products.

Fischer does not appear to have pursued these investigations, but Behrend has lately contributed to Liebig's *Annalen*, a series of important memoirs on "The Synthesis of Compounds belonging to the Uric Acid Group," which may, in fact, be looked upon as a continuation of Fischer's work. Almost contemporaneously with the publication of the last of these papers Horbaczewski announces from Vienna (*Monatshefte*, viii., 4) a new synthesis of uric acid which seems to throw considerable light on the nature of the tricarbon nucleus. The formula of Medicus supposes that this nucleus is constituted of the group $C=C-CO$, that is of a residue of acrylic acid $H_2C=CH-COOH$, and uric acid thus becomes the di-ureide of acrylic acid. Now this di-ureide might be formed by heating tri-bromo acrylic acid with urea in accordance with the reaction symbolized by the following diagram :—



$$CBr_2 : CBr.CO\cdot OH + 2CO(NH_2)_2 = C_5H_4N_4O_3 + H_2O + 2HBr.$$

This di-ureide should *ex hypothesi* prove to be identical with uric acid. Tri-bromo acrylic acid is, however, difficult to prepare, and when heated would in all probability undergo intrinsic molecular changes before it reacted with the urea. The same residue may be obtained from certain derivatives of lactic acid $CH\cdot CH\cdot OH\cdot CO_2H$, and these are far more easily obtainable. Horbaczewski employed the amide of trichlorolactic acid $CCl_3\,CH\cdot OH\cdot CO\cdot OH$. This acid was discovered by Pinner, and its amide is prepared from the nitril which is obtained by the combination of chloral with hydrocyanic acid. This amide when heated with urea might be made to yield uric acid according to the following scheme :—



$$CCl_3\cdot CHOH\cdot CONH_2 + 2CO(NH_2)_2 = C_5H_4N_4O_3 + H_2O + NH_4Cl + 2HCl.$$

Horbaczewski melted one part of this amide with ten parts of urea. Hydrochloric acid, with other bye-products, was formed, and a brown mass remained, which responded distinctly to the murexide reaction. It was, however, very far from being pure uric acid, but by a long series of purifications uric acid was obtained in every respect identical with the natural substance. The yield was about 15 per cent. If the interpretation of this reaction is correctly represented by the foregoing diagram, the possibility is opened of forming uric acid from a very large number of compounds which contain the same nucleus. It should, however, be observed that certain bodies from which uric acid ought undoubtedly to be formed, if this hypothesis is correct, have already been shown to yield not uric acid but entirely different compounds. Cech found that when trichlorolactic acid and urea react no uric acid is formed, but a 4-carbon compound the nature of which was not fully investigated. Again, Pinner failed to obtain uric acid or any similar compound by heating trichlorolactic acid with urea and water. It is not easy to understand the ready formation of uric acid from the amide and and the non-formation from, and, in fact, the entirely different behaviour of the acid. In this connection it is interesting to note, even though it be a mere coincidence, the occurrence in normal urine of the amido-lactamide of sarcolactic acid

$$CH_3CH\cdot NH_2\cdot CO\cdot NH_2.$$

The fact that this synthesis of uric acid is effected at a relatively high temperature and necessitates the use of a compound which is peculiarly liable to undergo profound decomposition, very seriously impairs the value of the reaction as a basis for a discussion of the "structure" of uric acid; indeed for the same reason the pure chemist is frequently on treacherous ground, and indeed it appears doubtful how far chemistry alone, without physical aid, will be able to solve the problem of the constitution of many important compounds, and unfortunately in the majority of instances this physical aid is not, at present, forthcoming. As regards uric acid, the least we can say is that the formula assigned to it by Medicus enables us to generalize and give symbolic expression to its most important modes of formation and transformation, and this, according to the illustrious Gerhardt, is the prime function of a chemical formula.

NOTE ON THE SEPARATION OF HYGRINE FROM COCAINE.

BY WM. C HOWARD, PH.D.

The question whether amorphous cocaine and hygrine are identical, the great difficulty attending the separation of cocaine from the basic mass, and also Dr. Stockman's paper on "Amorphous Cocaine" (*Pharm. Journ.*, April 23, 1887) led me to doubt the existence of an amorphous cocaine.

The plan of separating the basic principles by means of their platinum salts I have before found useful in dealing with alkaloids, and so tried it on the solution of cocaine in hygrine. The liquor containing the cocaine, hygrine, etc., was neutralized with hydrochloric acid; the amount of heat given off proved that strong alkaloids were present. It was then fully precipitated with platinum chloride, allowed to stand for a night, and filtered off. The mixed salt was amorphous or semi-crystalline, and rather light in colour. This was then washed with a large quantity of water at about 80° C.; a higher temperature was tried, but the salt caked.

The soluble salt decomposed with sulphuretted hydrogen, shaken into ether and the ether evaporated off gave a base that, when cold, crystallized. This base was then dissolved in acid, and shaken into light petroleum ether, and the ether evaporated off. The base crystallized at once. The platinum salt of this proved to be a light coloured, bulky, semi-crystalline precipitate; it was dried, washed with carbon bisulphide to remove sulphur, and finally dried over sulphuric acid and analysed.

I. 0·1878 gram gave 0·0358 gram platinum.
II. 0·2362 gram gave 0·0455 gram platinum.

Reckoned for $(C_{17}H_{21}NO_4HCl)_2PtCl_4$.	Found. I.	II.
Pt. 19·38 per cent.	Pt. 19·06 per cent.	19·26 per cent.

The base giving the soluble platinum salt then was cocaine, and the strong anæsthetic effect confirmed the analysis.

The insoluble platinum salt was then decomposed with sulphuretted hydrogen, shaken into ether, and the ether evaporated off, leaving the base as a fluid in which, though on standing it thickened considerably, no crystals appeared in a week or more. According to Lossen (*Annal. der Pharm.*, cxxi., 374) hydrochlorate of hygrine crystallizes freely. The base smells of trimethylamine, has no bitter taste, and gives a platinum salt which is decomposed by heating the liquid. The base I obtained gives no crystallizable hydrochlorate. The smell does not remind one of trimethylamine. It has an intensely bitter taste, and the platinum salt stands hot water well. It seems, therefore, probable that either Lossen's base was impure, or that mine is a different base altogether. He unfortunately also gives no analysis.

The platinum salt, which is darker in colour, and much less bulky than the soluble salt, differs in composition, as shown by the following analysis:—

I. 0·1488 gram gave 0·0275 gram platinum.
II. 0·1894 gram gave 0·0353 gram platinum.

I.	II.
Pt. 18·48 per cent.	18·6 per cent.

The base was, as above mentioned, extremely bitter, and is probably a body containing three atoms of carbon more than cocaine; it produces no numbing effect on the tongue.

Amorphous cocaine has, therefore, as far as I can judge, no existence, but is a solution of cocaine in the base above described. I hope to continue my research on this alkaloid if I can obtain enough material, as it is only contained or formed in small quantities.

THE ALKALOIDS OF COCA LEAVES.*

BY O. HESSE.

According to the observations I have made in reference to this subject, I have not become acquainted with anything to support the opinion put forward by Stockman, that amorphous cocaine is a solution of true cocaine in hygrine, although the amorphous base may contain some hygrine as the result of decomposition of some one or other cocoa base, and though hygrine may be separated from it by continued distillation with water, owing to its gradual formation, until the whole of the amorphous base is decomposed. Since the dilute solution of hygrine in hydrochloric acid has a strong blue fluorescence, this character furnishes a means of ascertaining whether or not hygrine is present in coca leaves. For this purpose it is only requisite to moisten the finely-divided leaves with ammonia, and shake with ether, then to extract the bases taken up by shaking the ether solution with dilute hydrochloric acid. When sound leaves are operated upon in this way the acid solution obtained presents at first no fluorescence, but after a time it gradually becomes distinctly fluorescent, showing that hygrine is a product of subsequent decomposition.

Hygrine is separated from solution in acids by ammonia or caustic soda solution as a colourless oil, with a basic reaction and a peculiar odour which crude cocaine sometimes possesses. Its solutions in dilute acids present a fine blue fluorescence. The solution in excess of hydrochloric acid gives, when mixed with chloride of lime solution and excess of ammonia, only a milky turbidity, but no coloration. A solution of the hydrochlorate also gives no colour when mixed with ferric chloride; with gold chloride it gives a yellow oily precipitate, and with platinum chloride a pale yellow crystalline precipitate.

As regards the amorphous portion of the coca bases which can be easily separated from cocaine, the above-mentioned fluorescent character of hygrine admits of the presence or absence of this base being ascertained. The material I operated upon contained no hygrine, and it gave a platinum salt that

* From the *Pharmaceutische Zeitung*, July 16.

yielded in two experiments 18·26 and 18·44 per cent. of platinum, the amount of water being respectively 5·00 and 5·50 per cent. These results would correspond satisfactorily with the formula

$$(C_{17}H_{21}NO_4)_2\,PtCl_6H_2+3H_2O$$

according to which the amorphous base would appear to have the same composition as cocaine. It is, however, evident that this amorphous material is not homogeneous, since I was able to separate from it by fractional precipitation a well-defined base, to which I have given the name of "cocamine," but I must add that at present I have only been able to obtain this base from a small-leaved variety of coca.

This new base has the same empirical formula as cocaine, $C_{17}H_{21}NO_4$. It dissolves readily in alcohol, ether or chloroform, and on evaporating these solutions, it remains in an amorphous condition. It dissolves with difficulty in petroleum spirit and in water. Dilute acids dissolve it readily, and ammonia produces in these solutions a voluminous flocculent white precipitate that appears crystalline under the microscope. The hydrochlorate of this base, $C_{17}H_{21}NO_4HCl$, is amorphous, has a neutral reaction, and is readily soluble in water and alcohol, but these solutions soon become acid. When dried at 120° C. the salt continues to lose weight, and eventually becomes no longer soluble in cold water, but communicates to it an acid reaction. On the contrary the crystalline platinum salt, $(C_{17}H_{21}NO_4)_2PtCl_6H_2+4H_2O$, only loses its water of crystallization at that temperature.

Cocamine melts at about 80° C., and it decomposes when heated a little above 100° C., or when boiled with an alcoholic solution of baryta. In this latter case an acid is produced which crystallizes from ether in needles like benzoic acid, but does not appear to be identical with it, since the ammonia salt gives with lead acetate a white flocculent precipitate, and with silver nitrate a white milky turbidity which lasts in a remarkable way for several weeks before a precipitate is formed.

The basic product formed in this decomposition does not appear to be ecgonine, for though dissolving readily in water, communicating to it a basic reaction, and crystallizing on evaporation in long broad needles, I did not succeed in obtaining from this base the characteristic platinum salt of ecgonine. The salt I obtained dissolved readily in water and in hot alcohol, separating from the latter solution only in translucent globular masses.

In confining myself for the present to the communication of these data I wish to add that I purpose continuing the investigation of the subject and especially that of hygrine and cocamine.

STROPHANTHUS AND STROPHANTHIN.

BY E. MERCK.

The first notices upon strophanthus and the poison contained in the seeds of this plant science owes to a communication from Professor Fraser in the year 1871. Two years later the 'Botanischer Jahresbericht' of Just contained a more exact description of the plant. According to this the strophanthus is a woody climber, belonging to the Apocynaceæ, which winds to the tops of the highest trees and has its home in the valley and mountain forests in the region above the Victoria falls of the Zambesi.

The fruit of the plant ripens in June. It consists of a capsule attaining a foot in length, formed of a rough external husk and a more leathery internal one, which latter encloses as many as two hundred seeds. These seeds are about 15 to 20 millimetres long, 4 mm. broad and 1 mm. thick, and bear upon the finely acuminate apex a stalk nearly 9 centimetres long, the upper third of which consists of a hairy pappus. The hairs of this pappus are about 6 mm. long, with a silky lustre, delicate and brittle, standing up on all sides like a sprinkling brush. At the base the seeds are rounded off, yellowish in colour, and covered with a felt of soft, silky, densely adpressed hairs.

Two kinds of seeds occur at present in commerce, a green-brown and a white variety. The former, described as coming from *Strophanthus hispidus*, was determined by Professor Oliver as being the "kombé seed" (*Strophanthus Kombé*, Ol.). But this question does not appear to be yet definitely cleared up, and therefore the possibility is not excluded that the white seeds are the true "kombé seeds" from which the natives prepare the "kombé" poison.

These seeds contain, besides fatty oil and albumen, that powerfully active poison which, under the name of "kombe," "inee" or "onage," has long been used as an arrow poison in West and Central Africa.

By means of strong alcohol a green tincture can be extracted from the seeds which contains the active principle in solution. If the fatty oil be previously extracted from the seeds with ether, the ethereal solution will also contain a certain amount of strophanthin, a condition to which the small activity of the alcoholic tincture of strophanthus of commerce is partially referable.

The strophanthin prepared by me from the seeds is a white crystalline powder which melts at about 185° C., volatilizes without residue, and shows in an intense degree the reactions of Elborne and Helbing.

Both the tincture of strophanthus and strophanthin are employed. The former, of a pale yellow colour and with a peculiar pungent smell and persistent bitter taste, is administered in doses of five to twenty drops twice a day, either alone or mixed with aqua laurocerasi.

For strophanthin the single dose of 0·0003 gram is indicated by English physicians, but in the Vienna General Hospital it is administered up to one to two milligrams a day, usually dissolved in aqua laurocerasi, and given in drops.

The action of both preparations as cardiac remedies has so far as trials have been made at present always been reported on favourably. Frequently within a few minutes of one of them being used, the pulse disturbance disappears, and neither interference with the digestion nor cumulative action, which frequently occurs during the administration of digitalis, has been observed with strophanthus.

THE HANDWRITING ON THE WALL.*

BY PROFESSOR J. U. LLOYD.

It may not be amiss to offer these brief reveries of a so-called self-made pharmacist to a wider circle of readers; they may not suit the taste of all, nor will their "true inwardness" be recognized by every one. Yet, in the problems involving the future of pharmacy, we should not yield too much to the maxim:

"Where ignorance is bliss,
'Tis folly to be wise."

I may state right here that when I refer to empiricists in pharmacy, I include myself and others who have

* From *Pharmaceutische Rundschau*, July.—Read at the meeting of the Ohio State Pharmaceutical Association, June 15, 1887. (The author has confined his discussion upon the trade aspects of the drug trade as well as of pharmacy; it is to be hoped that in a further paper he may also dwell with the same candour and force upon the professional side or the scientific relations of pharmacy and its present problems, as well as upon the prospective metamorphosis of the future pharmacist, either as a dealer only, or also as an "artisan" and scientist.—*Ed. Pharm. Rund.*)

stumbled into the profession by irregular labours and interrupted, unsystematic study. I will not here attempt to argue the final possible result of such labour, but simply state that we have had to do a large amount of work that under proper guidance was perhaps unnecessary. In this regard most of us stand together. We are, as a rule, pharmacists with high opinions of the olden time and former methods. We commenced our labours as apprentices or errand boys; we struggled at first with window washing, mortar and graduate cleaning, and perhaps scrubbing the floor. Then we were permitted to learn the weights and measures, to occasionally triturate a mixture in a mortar, to replace bottles after our employers had used them in compounding a prescription, and afterwards to even *bring* him shelf bottles to obtain his medicines from as we watched him filling a prescription. Thus we passed gradually to the weighing of these substances under the eye of our preceptor, the folding and dividing of powders, the measuring of liquids after our employer was sure we could read that particular prescription, and so on to filling prescriptions. Few of us had the advantage of a theoretical education at a College or School of Pharmacy.

This is the way we learned the business, and it is yet the only way to learn a certain part of it. However, those of us who thus reached a creditable position in our profession are confronted with the fact, for fact it is, the past is not the present.

Once we made our own pills, plasters, tinctures, syrups; there were but few fluid extracts and no elixirs. Elegant pharmacy was unknown. Now the plaster iron is nearly as great a curiosity as a hand spinning wheel or the old tin lantern. We purchase our pills ready made; our fluid extracts are supplied to many of us without more trouble than the extracting of a cork; tinctures and syrups are more or less obsolete, being replaced by pharmaceuticals that are perhaps not made by pharmacists.

Do I overestimate when I say twenty years only have thus altered our business methods? We have striven to repel the invasion, we have resented each innovation, we have attempted to devise methods whereby pharmacists could continue in the beaten path, but I am now of the opinion that we have been combating the inevitable. Do we lament this change? It matters not if we do. The tide is moving into new channels, we must either move with it or drown. Have we not examples of honourable and persistent men holding on to olden times, and do we not in every old city note the result? We may crawl into an old style store, we may keep a jar of snakes and lizards in our front window, we may thrust at each physician that pharmacy is degenerating, and we may growl at the condition of affairs as compared with the olden time. Our former patrons will one by one move away, the aged physician will die, the modern physician will propose to administer what he pleases as he pleases, the modern patron will insist upon getting medicines where there are sunlight and plate-glass show windows, where perfumery, stationery and cigars are sold, and even candy. These lessons are every day ones and painful, too. Struggle as we may such facts are incontrovertible. Finally, we will become sour and either snarl at a few who care nothing for us or will give up the business in disgust. Then our lizards and musty herbs, our snakes and old style ointment jars will be carted to the dump, and a man of the present style, perhaps not a pharmacist, but employing one, will paint the store and modernize the fixtures, will invite the sunlight and the people. A new business will then appear, and patrons will occasionally smile as they speak of the peculiar old pharmacist who refused to move on, whom the ladies shunned, the children shuddered at, the men passed by and physicians detested.

Doubtless the majority of us will modernize themselves under the pressure of circumstances, and accept the old doctrine of "*tempora mutantur, nos et mutamur in illis*," and move on with the throng, but I suspect that each locality will have its relic. To me there is something touching in these isolated, quaint and persistent men who refuse to read the handwriting, cover their face at the present, turn their back to the future and live in the past. I view them as men of character and men of courage, men who dare to do what they believe to be right and perhaps suffer to maintain the standing of their profession as they view the matter, and uphold the name pharmacist where there are, as they believe, so few *pharmacists*. Do not doubt their honesty, do not doubt their motives, they are very sincere, and if you will become acquainted with them you will find that from their store of knowledge there is much to learn that you cannot get elsewhere, and you will find them far from being as cross and petulant as the world believes them to be. Perhaps they are not even sad, for they may carry in mind the prosperous pharmacy days of former years and review them with pleasure. They may not be companionless. More than one aged friend will be found to spend hours in their dingy shops and together they enjoy themselves with the recollections of by-gone days.

Perhaps some persons may think that I have pictured an ideal figure, but others will refer to more than one character faithfully portrayed. No one city, but all that are of any age, have these connecting links between the past and the future; not one such man exists alone, there are many.

We look at this picture of the old time and forget ourselves. We think that we learned the modern part of the profession of pharmacy and forget that history repeats itself and that the hand is still writing as in the past; that the years fly swiftly. We think that only the old style pharmacist can be obsolete, and at the same time we unconsciously growl at the innovations of the younger generations. We oppose the "new-fangled notions," and we may combat the new ideas of pharmaceutical education and compare them with the day we were apprentices. Some of us may have just doubts about College learning and condemn the fact that pharmaceutical journals thrive and multiply, referring to the time when, in our younger days, one journal issued every two months was sufficient for the country, and but two Colleges of Pharmacy struggled for existence. We may even sneer at the term Pharm. D., Ph. Chem. and Ph. G. and begin to travel in the old path that leads to growling at everything modern, and eventually reach an isolation where we will serve the coming generation as a relic specimen, perhaps doing good in an educational manner as exhibiting the difference between the pharmacist of the past and of the present.

I would not have any one think that this is written as a trivial matter. I am not disposed to make light of such facts, and in my description I have endeavoured to confine myself to what I view as facts. I would not thrust a pin into myself as I really do when I think of the progress (?) in directions that rubs against the grain, because it is painful to the flesh. It is necessary though, I think, that we should look at ourselves occasionally, and I ask if *we* are not travelling the beaten road? Do we not criticize the present method of filling our stores with sugar-coated pills, with gelatine-coated pills and capsules? Do we not often oppose the ready-made plaster and lament the days so recently passed away when pharmacists were *pharmacists* in fact and not only in name? And do we not sometimes attempt to devise methods whereby the hands of time may be turned backward and the old styles detained? Do we not think of the time when a few officinal tinctures and syrups, with our staple chemicals and crude roots, barks and herbs supplied us material with which to fill all prescriptions? Do we not sometimes in a period of vexation sneer over these so-called elixirs of the present, and do we not get out of patience when physicians prescribe a preparation made by some particular person (not in our opinion a pharmacist) to the neglect of our own preparation that is in our opinion better? Have not some of us tried to check the

wheels of progress (in our opinion *so-called* progress), and have we not occasionally limped to our dens with a crushed toe while the wheel rolled on? Is it not true that many of us have fruitlessly opposed these innovations as they have swept over the country, and that we have viewed with detestation the great factories where men who perhaps never have pretended to be pharmacists make medicaments, and then under our very protest force us to use them? Have we not sometimes become irritated at a gentlemanly solicitor whose every attempt to dispose of his wares demonstrated the fact that he was not in the least acquainted with the first principles of their production or their properties, and yet whose unpleasant duty it was to travel over the country to introduce the novelties to physicians and to encourage us to use them instead of our own? Have we not more than once rebelled, and is it not usually to no purpose?

Pharmacists, as a rule, cannot but perceive that these are facts. We stand together, and I for one realize that slowly but surely we will become antiquated if we refuse to move onward. We must take the pharmaceutical journals, not one but several, and the *best ones*. We must read and study them, and there is something to be learned in the advertising columns as well as in the body of the journal. We must study indications and take advantage of each twist of the weather vane. The majority of us will be able to pass on with credit; we must do so if we keep in the path, but it will require an effort, while doubtless here and there an obstinate man will step aside and cling tenaciously to the olden time and serve the coming generation with an example of the pharmacist of other days. We must accept that our pills, ointments, plasters, chemicals, flavours, even our emulsions, syrups and tinctures will be made for us by men whom we call artisans. We must become *artisans* if we compete, and we must perhaps adopt their methods or give up the race with the so-called progressive pharmacists.

Our future field as pharmacists seems to be in mixing and supplying such substances as we can carry to advantage in our stores, unless the science broadens or we step into specialty making; and to oppose these innovations seems to be to slap at the hand of destiny that is writing on the wall so that "he who runs may read." To many these changes in our profession are unconscious and uncared for, but to many others they are painful. I am led to these remarks by the seemingly universal feeling among older pharmacists, that the profession is becoming demoralized. The change has not been abrupt, it is gradual; but as we make comparisons between intervals of time, it appears to have been by jerks. In my opinion we must be prepared to meet as great a revolution (advancement or retrogression, according to each one's view) in the near future as in the past.

I can see that we will continue to suffer, and those who rebel will do so at the expense of aching hearts. That our profession is not in a condition to rest on its oars is evidenced by the attention physicians give to new ideas and new remedies, and by the increasing use of dispensing the ready-made medicines to their patients; by the facility with which the grocery or dry goods men adapt themselves to the absorption of sections of pharmacy, or so-called pharmacy; by the obsolete remedies of the past, and those of the present that are nearly stagnant on our shelves; by the synthetical chemicals that are displacing nature's products, and that take from us a chance for old-fashioned pharmaceutical manipulation. These and other causes lead me to believe that unless we move quickly we will fall behind, and that instead of kicking against the pricks it behoves us to gracefully accept the modern alternative.

Finally, I will add that those who oppose this continual change are, as a rule, in my experience, *our best* pharmacists; educated, thinking men, who have a foundation for their arguments, whom all should honour, and in no wise should their earnestness be questioned. Usually these men begin the study with superior educations and maintain their position to the end and are aware of their advantages. I venture to say that in nearly every instance it will be found that these tenacious men are well informed and wide awake, and that it is not because of ignorance or indolence that they refuse to gracefully accept the present methods or rather *want of methods and principles*, but because of self-respect and respect for their profession. Some live in constant hope that the pendulum will swing back again, some may even think they observe indications of a change, but I will confess that it seems to me as though the past will not return in this generation. The methods and means by which medicines are made, sold, prescribed, advertised and dispensed appear to me to pass each year further from the accepted legitimate pharmacy of other days and with irresistible motion into new channels of perhaps less settled and principled methods and of still less stability.

ISCHL AS A HEALTH RESORT.*

The purposes for which patients visit Ischl are twofold. They hope to benefit by its genial and equable climate as well as by the brine baths; the air is regarded as quite as curative as its mineral waters. Indeed, the mineral waters are not remarkable. One spring, named after Dr. Wirer, on the right bank of the Traun, and in the part of the town which is called "Gries," gives forth very cold water which is so slightly mineralized as to have no perceptible taste. Another spring, called Maria Louisa, is two miles and a half distant from the town on the Salzburg road, which runs along the right bank of the river Ischl. This yields a weak saline water, which is not drunk on the spot, but is bottled and dispensed in the room at the principal bath-house where other mineral waters are supplied. A cold sulphur spring is used for bathing purposes. More importance is attached to the brine baths. The brine is obtained from the rock salt in the mountains. Pipes containing ordinary water are carried to the deposits of rock salt. When the water is saturated it is re-conveyed to the salt works, and there yields 26 per cent. of salt. Brine baths resemble those which can be had at Reichenhall, Nauheim and Kreutznach in Germany, and at Droitwich in England. It closely resembles a hot sea-water bath. To prevent misapprehension I should add perhaps that in translating the German "Soolbad" into brine bath I do not mean to convey that persons bathe in the concentrated brine. The truth is that a certain proportion of the brine—about 3 parts in 12 for an adult—is mixed with ordinary water, and a very strong salt-water bath is thus formed. Baths are taken in which other substances are used, such as the extract of fir needles or of the moor-earth. The brine is also applied to the throat and air passages in the form of spray, and very good results are said to be produced by inhaling it. There is a hydropathic establishment where the well-known processes of applying cold water are conducted under the direction of a medical man. There is a large swimming bath and "wavebaths," the latter being an attempt to represent artificially the action of the waves of the sea. The spoiled daughters of luxury who are very rich and have very sensitive skin, indulge in whey baths. Such baths are supposed to calm the nervous system; but their use may be better explained by the fact that they render the skin soft to the touch and silky in appearance.

A common complaint at many watering-places on the Continent is that persons go and drink the mineral waters and take baths without consulting with a doctor. There is no restriction at Ischl upon water drinking; indeed, the mineral water has no attraction, but bathing cannot be carried on except under medical sanction. The keeper of the bathing establishment is forbidden under

* Extract from a series of articles on "Austrian Health Resorts" in the *Times*.

penalty to sell tickets for brine baths to any one who is not provided with a doctor's permit. Hence, the patients are obliged to get medical advice before beginning their "cure." At some Italian watering-places a visit to the official doctor is compulsory; but one visit and the payment of ten lire restores freedom of action to the patient; he needs not return to the doctor unless he think fit and he may drink as much mineral water as he pleases and bathe as often as he chooses to pay for a bath. Sometimes the regulations about medical permission give rise to puzzling questions. I revisited Frazensbad some time ago. Wishing to take a bath, I found that I could not do so as it was about three p.m., the hour at which the bathing houses are closed. Finding the gas bath-house open, and being curious to try the effect of a carbonic acid gas bath, I went and had one. That bath has the convenience of not requiring undressing. Beyond a sensation of warmth all over the body, I did not find any marked result from it. I was not called upon to pay till I was leaving and then I was asked for the name of the medical man who had prescribed the bath, in addition to my own name and address, the object being to enter these particulars in a book. When I told the women who kept the book that I had taken the bath as an experiment and also because I could not get any other, she was sorely perplexed and informed me that it was contrary to the regulations. She said that she hoped no harm would ensue, but she evidently feared lest something dreadful would occur. Happily, I was none the worse and I trust that she has not suffered either.

Now, though no one is allowed to inhale brine or bathe in it at Ischl without a doctor's prescription, any one may take a Russian vapour bath there by paying the price. To take such a bath is a greater risk for some persons than bathing in salt water is for anybody. I found the Russian bath comfortable, and the attendant thoroughly competent. Every English reader may be assumed to be acquainted with a Turkish bath. The efforts of the late Mr. Urquhart to popularize these baths in England have been as successful as he could have desired. It may not be superfluous, however, to observe that the name Turkish bath is a misnomer, the proper name being Roman or hot-air bath. The sweating baths in which Mahomedans delight vary in different places, those of Morocco, Egypt and Turkey being dissimilar in matters of detail; yet a real Turkish bath more closely resembles what is commonly styled a Russian bath than the bath which is known in England as Turkish. In the Russian bath the active agent is hot steam, and the soothing effect on the air passages of the warm, moist vapour is both striking and curative. Such a bath differs from the vapour baths in use at English hydropathic establishments in this respect—that in it the steam is inhaled, whereas in them the steam is merely an agent for producing perspiration, the head being left uncovered by the waterproof which confines the steam round the rest of the body. In a Russian bath inhaling the steam is half the cure. It is to produce a like result that a "bronchitis kettle" is used in a bed-room by those who suffer from an irritated throat and chest; but if a Russian bath were taken double the good effect would be produced. The introducer of a Russian bath into London would be a far greater benefactor than Mr. Urquhart, to whom we are indebted for the so-called Turkish baths. At Marienbad and other places on the Continent this form of bath bears the name of the "Irish bath." In olden days the Irish were in the habit of taking baths in the same way that Russian peasants do now. If the Irish bath in its improved form were introduced into England by some energetic Irishman, the Saxons might accept the boon as partial and practical amends for the unmerited abuse and denunciation of eloquent Irish patriots.

In addition to taking baths of various kinds and drinking mineral water, the patients at Ischl have other forms of cure at their command. Chief among them is the whey cure, which is pursued methodically here. Professor Seegen, one of the highest authorities on health resorts and methods of cure, pronounces Ischl as specially adapted for the whey cure, the climate admirably suiting the patient for whom such a kind of treatment is appropriate. The whey used is made from the milk of cows, sheep, or goats. It is supplied at the pump-room, and patients go thither as early as six in the morning to drink it. If the effect of drinking whey be beneficial, the taste of it is most disagreeable, the worst sulphurous mineral water being not more nauseous. Another form of cure consists in drinking butter-milk. This is far more palatable than whey. For affections of the chest whey is prescribed, and butter-milk for certain diseases of the stomach. A form of cure which is in use here is intended to purify the blood and can be pursued only in the spring and early summer; it consists in eating plentifully of Alpine strawberries, Few patients object to this prescription.

The great charm of Ischl for those who are not invalids is its situation. It is in the heart of the Salzkammergut, at an elevation of 1600 feet above the level of the sea. It lies at the confluence of the rivers Ischl and Traun. Mountains rise and wide valleys open up on all sides. Each walk and prospect seems more beautiful than the other. At convenient distances are the lakes which form the charms of the Austrian Alps, such as the Traun lake, the Atter lake, the Mond lake, the Hallstädter lake, and the Wolfgang lake.

NOTES ON CHINESE MATERIA MEDICA.*

BY CHARLES FORD, F.L.S.,
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(*Continued from vol. XVII., p.* 927.)

3.—STRYCHNOS IGNATII, Bergius. St. Ignatius' bean.† N.O. Loganiaceæ. Syn. *Ignatiana philippinica*, Lour., *Strychnos philippinensis*, Blanco. Mandarin.—*K'u kuo tzŭ.*

History, etc.—We have been unable to find a reference to this plant in any Chinese work on either botany or materia medica.

The first account of this drug was given by Father Camelli, the Jesuit Missionary at Manila, as far back as 1699; and, although these seeds have been an article of commerce in different parts of the world ever since, but little, up to within a few months ago, was known as to their precise origin. In no herbarium in Europe could specimens of the plant in flower be found; and all modern writers on materia medica have been compelled to draw on Blanco and Loureiro for a description of this important species of *Strychnos*. The plate—No. 179—in Bentley and Trimen's 'Medicinal Plants,' is a copy of the figure given in the 'Philosophical Transactions' for 1699, which was a reproduction of the rough outlines attached to the original account of the drug communicated by Camelli to Ray and Petiver, and by them laid before the Royal Society of London, in the same year.‡

In the list of inquiries relating to pharmacology and economic botany, drawn up in 1871 by Professor Oliver and Mr. Daniel Hanbury, for the 'Admiralty Manual of Scientific Inquiry,' we find the following in the section referring to China and the Philippines§:—

* Reprinted from advance sheets of the *China Review*, communicated by the authors.

† Named, on account of their virtues, after St. Ignatius Loyola, the founder of the Society of Jesus. In South America, *St. Ignatius' bean* is a common name of several seeds derived from plants of the N.O. Cucurbitaceæ.

‡ 'Pharmacographia' (1879), p. 432.

§ 'Science Papers,' by D. Hanbury, F.R.S.; ed. J. Ince (1876), p. 190.

"St. Ignatius' beans, called in the Philippines *Coyacoy* or *Pepita de Catbalogan*. The plant, said to be a climbing shrub, to which the name *Ignatia amara* was given by the younger Linnæus, is a species of *Strychnos* probably unknown to modern botanists. It is believed to grow in Bohol and Cebu, islands of the Bisaya group of the Philippines. As it is one of great interest, no opportunity should be lost for procuring abundant flowering specimens, as well as the entire fruits, both dried and preserved in alcohol, and some considerable pieces of the stem with bark attached."

About two years ago we made strenuous efforts to procure the material necessary for setting at rest all doubts as to the identity of this important drug. Although not completely successful, a distinct advance was made. With the generous assistance of the Rev. Father Vigano, of the Roman Catholic Mission in Hong Kong, we succeeded in procuring specimens of the leaves and twigs, and also a portion of the stem and root. Father Vigano also sent us a young tree, but the journey from the Bisayas had evidently been too much for it, for although it was carefully tended by Mr. A. B. Westland, of the Hong Kong Botanic Gardens, it never showed any signs of life.

The leaves in our possession correspond exactly with the description given by Blanco* and Loureiro ;† length about 5 inches (12 to 13 cm.); breadth, about $2\frac{1}{2}$ inches (6 to 7 cm.). The venation, characteristic of the genus *Strychnos*, is well seen in the leaves of this species.

The stem‡ has a diameter of about 3 inches (7 to 8 cm.); the bark is marked externally with numerous warty processes.

While this note was in preparation we received intelligence that the tree was figured and described in a recent publication of the 'Commision de la Flora Forestal de Filipinas;' and a copy of the work having now been kindly placed at our disposal by the author, we are glad to find that everything has been so far satisfactorily settled as to render further investigation on our part unnecessary.

The description is found in an appendix to the 'Revision de Plantas Vasculares Filipinas,' by Don Sebastian Vidal y Soler, chief of the Commission, published at Manila in 1886.

As *Strychnos Ignatii* is not known to be indigenous to China Proper, a detailed botanical description would be out of place here. A careful perusal of Don Vidal's account, and an examination of the two accompanying plates, lead us to infer, that no change will be made in the name awarded to this plant, by Bergius, more than a century ago. The characters agree, in every detail, with those required of plants belonging to the genus *Strychnos*. According to Snr. Vidal,§ the leaves are from 4 to 10 inches (10 to 25 cm.) long, and 2 to 5 inches (5 to 13 cm.) broad. The fruit is from 4 to 5 inches (10 to 13 cm.) in diameter, and may contain as many as forty seeds.

Habitat, etc.—The author of this 'Revision' states that the tree grows on the islands of Samar and Masbate. It is also said to grow in Bohol and Cebu, where it is known by the name of *Coyacoy*. According to Loureiro, it is found in Cochin China, where it is known as *Ho daut gio*, having been introduced there from the Philippines.

The plant and seeds are known in the Bisaya language, by the name of *Pangaguason, aguason, canlara, mananaog, dancagay, catalonga* and *igasur*; by the Spaniards of the Philippines, as *Pepita de Bisaya* or *Pepita de Catbalogan*.* In the drug shops of India, the seeds are found under the name *Papita*.†

Part used, etc.—The seeds are the only part used in medicine. As met with in the drug shops of Hong Kong they differ in no respect from the seeds found elsewhere. The average weight of authentic specimens from Manila is 51 grains. The best description with microscopic drawings of the fruits and seeds will be found in a paper by Professor Flückiger and Mr. A. Meyer, in the *Pharmaceutical Journal*, [3], xii., p. 1.

The seeds are said to contain 1·5 per cent. of strychnine, and ·5 per cent. of brucine. It is not unlikely that higher percentages would be obtained by adopting the process proposed in 1883 by Professor Dunstan and Mr. Short,‡ for extracting alkaloids from the peculiar horny albumen of such seeds as these. St. Ignatius beans are generally regarded as being more poisonous than nux vomica.

Portions of the bark detached from the trunk received from the Philippines have on analysis afforded us abundant evidence of the presence of both strychnine and brucine.§

There has been some confusion as to the name under which St. Ignatius' beans are met with in China.

In 1861‖ Mr. Hanbury stated that this drug was known by the Chinese as *Lü sung kuo, i.e., Luzon fruit.*

In 1871¶ Dr. Porter Smith stated that he had not met with the drug, but that it was apparently known to Chinese writers by the name *K'u shih pa tou.* This, it will be observed, is one of the names awarded in the *Pên ts'ao* to the seeds resembling those of *S. nux-vomica.* We have experienced no difficulty in procuring St. Ignatius' beans in Hong Kong, where they are known as *K'u kuo tzŭ, i.e., bitter fruit seeds* : and this name corresponds with the one given in Tatarinov's 'Catalogue of Pekin Drugs.'**

Dr. Porter Smith points out that under the character for *Sung*, are to be found the fruits of a species of *Pinus.* We have confirmed his observation in this respect. The confounding of the fruits of some species of *Pinus* with St. Ignatius' beans may be easily explained. The person who furnished the Chinese name of the specimens forwarded to the late Mr. Hanbury was not acquainted with their real name; but knowing that they had come from the Philippines, and not wishing to appear ignorant, he called them *Luzon fruits*; a name that would be quite as applicable to the fruit of any tree or plant growing in the Philippines, as to the seeds of *S. Ignatii.* Now for the sound *sung*, the wrong character was affixed, representing with the Chinese the generic term for any species of *Pinus.* We can quite understand the native herbalists supplying some part of a pine tree, when asked for a drug, the name of which had this particular character for *sung* associated with it.

Uses, etc.—St. Ignatius' beans are not largely used by the Chinese in Hong Kong. Many of the native doctors

* 'Flora de Filipinas' (1837), p. 82.

† 'Flora Cochinchinensis' (1793), ed. Willdenow, p. 155.

‡ Specimens of the leaves, trunk, and root may now be seen in the Museum of the Pharmaceutical Society of Great Britain; and in the Herbarium of the Hong Kong Botanic Gardens.

§ 'Revision de Plantas Vasculares Filipinas;' S. Vidal; Manila (1886); Appéndice, p. 449.

* Blanco, 'Flora de Filipinas,' p. 84; also Clain, 'Remedios Faciles;' Manila, 1857, p. 610 (from 'Pharmacographia,' p. 431).

† Dymock, 'Materia Medica of Western India (1st edition), p. 445.

‡ *Pharmaceutical Journal*, [3], xiii., p. 665.

§ *China Mail*, March 31, 1887.

‖ 'Science Papers,' by D. Hanbury, p. 230.

¶ 'Contributions towards the Materia Medica and Natural History of China' (1871), p. 116.

** 'Catalogus medicamentorum sinensium'; A. Tatarinov; Petropoli (1856); No. 248. We are indebted to Mr. E. H. Parker, of Her Majesty's Consular Service, for the perusal of a MS. copy of this excellent little work, the value of which, from a scientific point of view, has been ably demonstrated by Dr. Bretschneider, in his 'Botanicon Sinicum,' published in the *Journal of the North China Branch of the Royal Asiatic Society*, vol. xvi., part I., p. 123.

do not know them at all. They appear to enter into the composition of powders, etc., for the treatment of cutaneous affections, in much the same way as the seeds of *S. nux-vomica*.

ANALYSIS OF THE LEAVES OF TUSSILAGO FARFARA, LIN.*

BY CHARLES S. BONDURANT, PH.G.

The leaves were carefully freed from the long petioles and other extraneous matter. On account of their tomentose character considerable trouble was experienced in reducing them to No. 80 powder. Moisture determined in a portion of the air-dried drug amounted to 7·8 per cent. This may include a small percentage of volatile oil which was also present.

Fifty grams (50 gm.) were taken for analysis. Complete exhaustion with petroleum spirit yielded 2·18 per cent. solid matter at 100° C. On increasing the temperature to 110° C. an acrid volatile oil was driven off in small quantity. The residue after driving off volatile oil, yielded nothing to distilled water. Boiled with absolate alcohol, the solution, on cooling, deposited a small amount of waxy matter of low melting point. Caustic potash was added to the alcoholic solution, and after boiling, diluting and acidifying, a small portion separated insoluble in water, showing the presence of a small amount of resinous matter. That portion of the petroleum extract insoluble in absolute alcohol was caoutchouc, soluble in chloroform, bisulphide carbon and ether, not saponified with strong solution of potassa.

The residue of the original 50 grams was next macerated with stronger ether until exhausted with that solvent, which extracted 2·63 per cent. solid matter sparingly soluble in distilled water, to which it imparted an intense bitter taste. This aqueous solution contained no tannin, and gave no reaction for alkaloids, but was found to readily reduce Fehling's solution after boiling with dilute hydrochloric acid and neutralizing, thus giving evidence of a glucoside. After evaporating this aqueous solution on a water-bath to a small bulk, and placing this over sulphuric acid for several days, a white amorphous solid had separated, quite bitter and inodorous, but on boiling with dilute sulphuric acid, a strong odour, similar to that of wetted leather, was envolved. Thus decomposed and neutralized, the liquid reduced Fehling's solution.

That portion of the ethereal extract insoluble in water was treated with hot absolute alcohol which failed to dissolve the whole of the residue. The alcoholic solution filtered and poured into a large quantity of acidulated water, separated a dark brown-reddish resin, which on drying became brittle, dark red with concentrated sulphuric acid, whitish on the addition of water, and was soluble in concentrated solution of caustic potash. That portion insoluble in boiling absolute alcohol was found to be caoutchouc which had escaped extraction with petroleum spirit.

The residue after exhaustion with stronger ether was macerated for twenty-four hours with absolute alcohol and filtered. On evaporation an extract remained which amounted to 3·28 per cent., the greater portion of which was soluble in distilled water. The aqueous solution was free from alkaloids, with ferric chloride showed evidences of tannin, and with neutral lead acetate yielded a precipitate containing 2·64 per cent. of organic matter, while gelatin and alum precipitated 2·42 per cent., the difference being probably gallic acid.

The small portion not dissolved by distilled water from the alcoholic extract was found to be resinous and similar in character to that obtained in the ethereal extract.

The petroleum spirits, ethereal and alcoholic extracts were strongly coloured green by the chlorophyll present in the leaves. The solutions were distinctly green by transmitted and dark red by reflected light.

The residue from the alcoholic treatment was dried and macerated with distilled water during twenty-four hours, then filtered and made up to known volume by passing distilled water through the filter. The extracted matter amounted to 11·22 per cent. The aqueous solution, treated with two volumes of absolute alcohol precipitated 3·42 per cent. of mucilage; the filtrate concentrated and treated with four volumes of absolute alcohol deposited 6·23 per cent. of dextrin and allied carbohydrates, and the filtrate from this on evaporation yielded saponin, insoluble in absolute alcohol, soluble in chloroform, turning purple with concentrated sulphuric acid, and yielding frothing solutions with water.

The residue of the powdered leaves left after treatment with water was next treated with a 0·2 per cent. of solution of caustic soda, the filtrate slightly acidified with acetic scid, and mixed with three volumes of 95 per cent. alcohol; the precipitate was dried at 100° C., weighed, incinerated, and after deducting the ash, gave 6·21 per cent. albuminous matter present.

The residue of the leaves not dissolved by caustic soda was treated with dilute hydrochloric acid, the filtrate neutralized with ammonia, the precipitate dried, and incinerated to calcium oxide, and calculated to calcium oxalate, amounting to 1·26 per cent.

The residue of the 50 grams of powder, on being treated with distilled water and chlorine gas, lost 19·42 per cent. of lignin and incrusting substances, the dried residue of 28·43 per cent. constituting cellulose.

A qualitative examination was made of the ash weighing 17·10 per cent. of the powdered leaves; it contained potassium, calcium, magnesium, iron and aluminium, chlorides, phosphates, carbonates and silicates.

* From the *American Journal of Pharmacy*, July.

ANALYSIS OF ONIONS.*

BY PROFESSOR CHAS. A. GOESSMANN.

The analysis was carried out under my direction by Messrs. Charles Wellington and E. B. Bragg, of Amherst, Massachusetts, graduates of the class of 1873 and of 1875 of the Massachusetts Agricultural College.

One thousand parts of air-dry onions, without the leaves, proved to consist of:—

Water (at 100°—110° C.) . . .	892·0 parts.
Dry vegetable matter	108·0 „

The latter contained 2·12 parts of nitrogen, 0·48 parts of sulphur, and left by a careful combustion 4·36 parts of ash-constituents. One bushel of onions—equal to 52 pounds—consisted in our case of 46·38 pounds of water and 5·62 pounds of dry vegetable matter.

One hundred parts of the above-mentioned ash of the onions contained the following percentages of essential articles of mineral plant-food:—

Potassium oxide	38·51 per cent.
Sodium oxide	1·90 „
Calcium oxide	8·20 „
Magnesium oxide	3·65 „
Sesquioxide of iron	0·58 „
Silicic acid	3·33 „
Phosphoric acid	15·80 „

Sulphuric acid not determined.

The sulphuric acid contained *in the ash* has not been determined; for the result, however carefully it might have been secured, would not convey a correct idea regarding the amount of sulphuric acid which a complete oxidation of the *entire* quantity of sulphur contained in a well-developed and fresh onion will produce. The above-mentioned 0·48 part of sulphur, found in 1000 parts of air-dry onions, represents the entire amount of that element present, without reference to any particular form; 0·48 part of sulphur is equal to 1·2 parts of an-

* From the *American Chemist*, April.

hydrous sulphuric acid. It is quite customary in reporting the analytical results of agricultural objects, as seeds, roots, straw, etc., to state the entire amount of sulphur found as sulphuric acid; for the latter compound is the form in which its total quantity is usually by weight determined. Adopting that course here, a calculation of the previously specified analytical statements shows, that in our case from 441 to 442 bushels, of 52 pounds each, of onions in an air-dry fresh state, contained :—

Potassium oxide	38·51	pounds
Sodium oxide	1·90	„
Magnesium oxide	3·60	„
Calcium oxide	8·20	„
Sesqui-oxide of iron	0·58	„
Silicic acid	3·33	„
Phosphoric acid	15·80	„
Sulphuric acid	29·81	„
Nitrogen	48·63	„

The composition of the onions, as represented in the preceding figures, appears quite remarkable when compared with that of most other farm crops. The percentage of their ash constituents is small, similar to that of some of our fruits, as pears, plums, cherries, etc.; the potassium and the nitrogen, and in particular the sulphur, are present in exceptional large proportions.

The most striking property of the onions consists in their strong and peculiar odour, particularly when lacerated or crushed. This characteristic odour is mainly due to a volatile organic compound containing sulphur.

The element sulphur is an essential plant-constituent; it occurs in larger or smaller proportions in all plants, and usually mainly in two conditions, namely, in an oxidized form, as sulphuric acid, in combination with the alkalies and alkaline earths—as potassa or lime, and also as a mere elementary constituent of a very important group of nitrogen-containing organic compounds, commonly known by their generic name as vegetable albuminoids. The latter are in their original state either soluble or insoluble in water at ordinary temperature, and occur in both modifications, quite generally diffused in varying quantities in all parts of the growing plants. Some of their representatives, as vegetable albumen, vegetable fibrin or gluten, and vegetable casein or legumin serve in the animal economy as the principal material for the formation of blood and flesh. The comparative high feeding value of the seeds of the cereals, as wheat, rye, oats, etc., and of those of the leguminous plants, as beans and peas, depends on the large percentage of albuminoids. gluten and legumin which they contain. Neither of these previously mentioned sulphur-containing constituents of plants impart any particular odour to the latter, which could be properly ascribed to the presence of sulphur; nothing short of a decomposition of the plant, under a limited access, or an entire exclusion of the air will produce the offensive odour of volatile sulphur compounds. There are, however, known, comparatively speaking, a few families of plants, which contain a part of their sulphur in combinations of an exceptional character. The most conspicuous quality of these peculiar organic sulphur-containing compounds consists in the circumstance that they impart under certain conditions, strong and offensive odours to the plants or parts of plants which contain them. These odours are noticeable in some plants already during certain stages of their growth, and vary in intensity in their different organs; for instance, in the case of the onion, *Allium Cepa*, L., and the common garlic, *Allium sativum*, L. In other plants they are not formed during any particular period of their development, but may be evolved by crushing the plants or their particular parts, and adding water at a suitable temperature to favour a mutual reaction of the contents of their various systems of cells upon each other, as in the case of the black and the white mustard seeds—*Sinapis nigra* and *Sinapis alba*, L.

Changes like those previously stated do not cease at once after these and similar vegetable substances have been consumed as food, nor are the offensive-smelling combinations after entering into circulation at once oxidized; they permeate the entire animal system, and impart their peculiar odour, more or less, upon almost every form of animal secretion; in case of cows upon the milk in particular. The well-known effect of a small quantity of the common garlic on the quality of the milk, if by chance consumed, is a practical illustration of the previous remarks. Two of the best investigated substances which cause these results, and are well known in many of their relations to chemists, are allylsulphide and allylrhodanide. The former causes in a large degree the odour of the common garlic and the onions; the latter, that of the moist, crushed, black mustard seeds. Vegetable constituents, which give rise to these and similar volatile organic sulphur-containing compounds of an offensive odour, are by no means confined to the few plants thus far referred to; they are, judging from actual observation and from analogy in particular, quite frequently found in larger or smaller quantities within the representatives of many species of two great, and from an agricultural standpoint, very important families of plants, namely, the Liliaceæ, to which the onion and the garlic belong; and the Cruciferæ, to which mustard, cabbage, radish, turnips, etc., belong. One of the first conditions of a good pasture for dairy business is the exclusion of plants of the above description.

AN ECONOMICAL METHOD OF PREPARING ANTISEPTIC GAUZE.*

Dr. Gerster, of New York, in an article in the *New York Medical Journal* of April 2, 1887, describes his method of preparing gauze as follows :

Gauze—that is, *cheese or tobacco cloth*, as it is called by the trade—can be procured at any dry-goods store for a trifling sum of money. Twenty-five yards of this fabric are divided into four equal parts. Each of these is folded eight times, and the piece is rolled up loosely and tied with a string. These four pieces of gauze are next made absorbent by freeing them of their oily contents adhering to the cotton from the gin or mill. They are put into a common wash-boiler, covered with water to which a pound of washing soda or saleratus was added, and boiled for an hour. After this they are rinsed in cold water for ten minutes to free them from the soda, are passed through a clothes-wringer and placed in a stone or glass jar or an enamelled kettle, filled with a corrosive sublimate lotion of 1 to 1000 strength, to remain therein for twenty-four hours. From this they are passed through the wringer again, and hung up to dry over night, when the air is freest from dust. The string put about each piece should not be removed until the time of drying, as it will keep the folds from getting disarranged. The dried pieces are ready for use, and will keep clean wrapped in a towel or put away in a jar.

Whenever dressings are used, suitably-sized compresses, each having eight folds of cloth, can be cut out of the piece with a stout pair of sharp scissors.

Iodoformized gauze is made by sprinkling iodoform dust from a pepper-shaker uniformly over the moist compress, and rubbing it thoroughly into the meshes between the fingers.

An excellent substitute for gauze in an emergency is common cotton-batting well soaked in a solution of corrosive sublimate (1 to 1000). The package of batting is unrolled in an ordinary manner, and cut into square pieces of desired size. Each of these is refolded into a small square and thoroughly kneaded in a wash-basin filled with the mercuric lotion, till complete saturation is evident. Well wrung out, each piece is unfolded again to its original shape, and is ready for use.

Any clean textile fabric of cotton or linen, soaked in mercuric lotion, will be a good antiseptic dressing.

* From the *Boston Medical and Surgical Journal*, June 2.

The Pharmaceutical Journal.

SATURDAY, JULY 23, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

REVERSAL OF THE "LEITH DEPOT" JUDGMENT.

THE judgment that has been delivered by the judges of the Court of Appeal in Edinburgh respecting the case of the Leith Depôt serves at once to illustrate what has been termed "the glorious uncertainty of the law," and also to justify the opinion that litigation of the points in question was undesirable. The judgments delivered at some length by two of the presiding judges will be found at page 85. In that of the Lord Justice Clerk there is at the outset a very unreserved declaration of his opinion as to the Pharmacy Act of 1868 being a very defective one. It was from consideration of the defect of the Act in respect to the state of things disclosed in the case before him that he was led to the conclusion that the principles announced in the House of Lords' judgment must be held to govern the case, and to necessitate a reversal of the conviction obtained before the Sheriff. But it will be observed that in expressing this opinion Lord MONCRIEFF confessed to having experienced some difficulty, and though recognizing the fact that the draughtsman of the Act had not taken into account that some of the acts provided against might be within the capacity of persons who could not acquire the statutory qualification, that in short he had not taken into account that a corporation would thus be outside the scope of the Act, still Lord MONCRIEFF added, without any reservation, that this was a category which ought to have been provided for in the Act. He held that it would have been but a reasonable provision that if the business of a chemist and druggist were carried on by persons who were not themselves capable of acquiring qualification, the actual selling and dispensing of drugs should be done solely by persons who had acquired the qualification. There is in this view of the matter no slight degree of sympathy with the idea of personal qualification that is, from a pharmaceutical point of view, so essential in persons engaged in the practice of pharmacy, but instead of regarding the possession of that qualification as being essential for the person keeping open shop or the proprietor of a business, it appears that the legal mind is more disposed to regard the possession of such qualification essential in the persons actually selling, by whose hands business transactions are carried out, even though they may only hold the position of employees. This same tendency has been made manifest on various occasions before, and it was probably under the influence of such a view of the matter that the argument used in the case of the London and Provincial Supply Association as to the safety of the public being sufficiently secured by the employment of qualified assistants carried so much weight with the judges in former trials.

The judgment delivered by Lord YOUNG travels over much wider ground. While fully concurring with his colleague in regard to the case being governed by the judgment of the House of Lords, and expressing his satisfaction at having the opportunity of concurring with it, Lord YOUNG did not hesitate to declare himself doubtful whether any special legislation is necessary for ensuring that drugs should be dispensed by qualified persons. He appears to think that the public interest in this important particular might be sufficiently secured by ordinary competition, as in all other trades, or at least secured to such an extent as the public desires. After that expression of opinion Lord YOUNG proceeded to discuss the subject of prices of medicine quite in accord with the prevailing popular craze for low priced articles which is exercising such an evil influence in all branches of trade, and even of professional practice. But leaving this digression from the real points at issue to be followed in our report of the judgments, it may be added that those who consider the object of the Pharmacy Act to be the protection of chemists and druggists will not find much consolation in the opinions of Lord YOUNG, according to whom the safety of the public is the only object of the Act. That he considers to be entirely protected by the provision that if the business of a chemist and druggist be carried on in any shop, the drugs shall be compounded and dispensed by duly qualified persons. And as regards any possible difficulty in the case of an unqualified assistant dispensing and compounding drugs, Lord YOUNG is of opinion that the language of the House of Lords' judgment in the case of the London and Provincial Supply Association distinctly points to the prosecution of such an assistant under the statute.

There can be no doubt that this decision will be productive of a deep feeling of disappointment in the trade at large, and that some of the views propounded by the judges more or less incidentally will also be regarded as likely to raise questions of much importance. Perhaps at the present moment some useful effect may at the same time be produced in leading those engaged in the business to perceive more thoroughly the need for greater unity and mutual support, and for the maintenance of an efficient representative body, by whose assistance their interests as a class might be considered and cared for. It is matter for regret that hitherto

the value of the Pharmaceutical Society in this respect has been so little appreciated by many members of the trade, and that even in the case of an association aiming especially to afford protection to purely trade interests, the absence of a sense of the necessity for incorporation and co-operation should have led to its collapse. But as it is an ill wind that blows no good, it may perhaps be hoped that this last experience may have the effect of convincing the pharmaceutical community that if they hope for protection of their legitimate interests they must look for it in concerted action among themselves rather than elsewhere.

CHEMISTRY OF STROPHANTHUS.

We are glad to see that Dr. Fraser has again taken up the investigation of the active principle of strophanthus, and that there is a prospect of obtaining some better knowledge of the chemistry of this drug. In the abstract of the note on this subject read before the Royal Society of Edinburgh (see p. 69), there is a description of the method by which Professor Fraser first obtained the active principle, to which he gave the name of strophanthin, in 1871, and at the same time it is pointed out that the substance is so liable to alteration that it may be entirely decomposed in the process of extraction. This circumstance will probably account for recent failures to obtain a substance corresponding to the description of strophanthin originally given by Professor Fraser, and it may also account for the discrepancy between his observations and those subsequently made by Messrs. Hardy and Gallois. The process adopted by these experimenters for the extraction of the active principle of strophanthus appears likely to have determined the conversion of the glucoside existing in the seeds into another substance, strophanthidin, which is a product of the action of acids, and is not itself a glucoside. It will, at least, be evident from the facts stated by Professor Fraser, that extreme care must be exercised in the extraction of the active principle of strophanthus and in any attempt to determine the strength of tinctures or other preparations of the drug by the amount of strophanthin present. There is a very considerable difference between the doses of strophanthin given by physicians in England and in other countries—for instance, it is stated that in the general hospital in Vienna as much as from one to two milligrams of strophanthin is given daily. While speaking of this subject the opportunity may be taken to refer to a recent report of the proceedings of the Société de Biologie of Paris, published in the *Archives de Pharmacie*, where regret is expressed that the discovery of strophanthin should be ascribed to Professor Fraser by a Frenchman when that substance was shown in 1878 by Gallois and Hardy at the Exposition Universelle. It is strange that the sensibility of Frenchmen in regard to the claims of discoverers does not induce them to acquire a more correct knowledge of facts. In the present instance the discovery of strophanthin by Professor Fraser took place in 1871, and it is probable that the substance exhibited by Gallois and Hardy was not strophanthin at all.

THE COCA ALKALOIDS.

The chemistry of the coca alkaloids is still sufficiently obscure to make further investigation desirable, and from this point of view we call attention to two contributions on the subject in the present number. Both of them agree in confirming the fact that has already been pointed out in this Journal of the association of an amorphous base with the true cocaine to which the production of local anæsthesia is referrible. To judge from the title of Dr. Howard's paper, the existence of "hygrine" appears to be taken for granted, and though the consideration of that point does not come within the special scope of Dr. Hesse's paper, the existence of "hygrine" is so far admitted by the author that he ascribes to it a particular character by which its presence can be recognized. Unfortunately Dr. Hesse does not describe the general chemical character of the substance to which the character of fluorescence is due, nor does he state how it is to be prepared, and if the base obtained by Dr. Howard from the insoluble platinum salt be the substance referred to as "hygrine" it is evident from the description he gives that it is very different from the substance spoken of by Lossen and Wöhler as being probably a natural constituent of coca leaves. As this term "hygrine" has been so much made use of lately, it may be useful to recapitulate the account given by Lossen, which is to the effect that in the extraction of cocaine by means of amylic alcohol he obtained a second base that was liquid, volatilizable, strongly alkaline, had a smell like trimethylamine, but no bitter taste. Its hydrochlorate crystallised well, but was very deliquescent. The platinum salt was a flocculent precipitate that decomposed on heating the liquid in which it was suspended. In a subsequent paper he speaks of this basic product as being a mixture of several substances. All this, however, has very little to do with the fact that cocaine and cocaine salts, as they have been met with in commerce, often contain more or less of an amorphous base that appears to be distinct from the crystallizable base. Dr. Howard commences his paper by expressing a doubt as to the existence of "amorphous cocaine," and he concludes it by the statement that such a substance has no existence. But it can scarcely be intended to dispute the existence of an amorphous base associated with cocaine in coca leaves, in the crude cocaine imported from South America, and sometimes also in the cocaine salts of commerce. Indeed the description given by Dr. Howard of the base he obtained from the insoluble pla-

tinum salt is in itself sufficient to prove that true crystallizable cocaine is accompanied by an amorphous base. Dr. HESSE has also obtained an amorphous base, but neither that nor the base obtained by Dr. HOWARD presents the characters of the base named hygrine by LOSSEN. In both cases the work done must be regarded as only adding to our knowledge of the subject, without by any means clearing up the chemistry of the coca alkaloids so much as is necessary. As a matter of pharmaceutical practice, however, it is clear that the objections formerly raised in this Journal to the use of a preparation consisting of the hydrochlorates of the mixed alkaloids of coca leaves were by no means without reason, and from the subsequent observations that impure cocaine salts are apt to produce local irritation when used for anæsthesia, it is equally clear that care should be taken in the preparation of these salts to eliminate all impurities and associated alkaloids. From this point of view it matters little what name is given to the foreign substances, though it will be a fitting subject for investigation by chemists for the purpose of ascertaining how pure preparations may be obtained.

It is not a little amusing to observe the importunity with which the purveyors of artificial butter are now pleading for permission to make use of the term "butterine" to designate the material that has for a long time been so largely substituted for butter made from cow's milk only. In the Bill now before Parliament it has been proposed to make the sale of the artificial product illegal under any other name than that of "margarine," and immediately an influential deputation appeals to the Board of Trade to secure the reinsertion of the word "butterine." This anxiety for the retention of a term of which there has hitherto been so little use is calculated to excite curiosity if it does not justify suspicion. It has been very generally the case that persons requesting to be supplied with butterine have been assured that this article was never kept, though very often a chemical examination of what was sold under the name of butter gave good reason for believing that the article supplied was not wholly derived from cow's milk. Moreover, it is notorious that enormous quantities of artificially prepared animal fat not obtained from cow's milk have been manufactured and imported into this country and disposed of without the term "butterine" having been made use of in reference to it to anything like an equal extent. It is perhaps no very hazardous conclusion that this material has largely passed into consumption as butter. In many cases it is prepared with such skill as to be indistinguishable from butter, and if it had always been sold under the name of "butterine," as an imitation and substitute for butter, there would certainly have been a much stronger ground for the claim that is now put forward for making the use of this term legal. The word "margarine" is unquestionably far more likely to suggest the real origin of the butter substitute, and less likely to leave the purchaser under the impression that it is the produce of cow's milk, and as that is really the object of the Bill now before Parliament, there seems to be little for the sellers of this article to do, but regret that they have not, by actual use of the name which they now claim as being properly applicable to it, appropriated that designation of the butter substitute so as to preclude any need for asking to be allowed to use it in the future.

* * *

The recent vigorous protest by Professor Attfield against indiscriminate sewer ventilation has led to some correspondence, reference to which is made in an appendix to the paper as published in the Transactions of the Hertfordshire Natural History Society. In answer to inquiries Professor Attfield repeats that his proposal is to close all badly smelling road gratings, and in the comparatively few cases in which any vent for the air of a sewer is necessary, to continue one of the sewer air pipes, now terminating in a road grating, up the side of a house, the trunk of a tree or a high lamp-like shaft. These views have received the endorsement of Dr. Frankland, Mr. Baldwin Latham, C.E., and others. Dr. F. Haycraft Berry, as evidence of the dangers attending the escape of sewer gas through road gratings, states that in Watford, whilst certain parts of the town, as yet unblessed with sewer ventilators, have enjoyed an immunity from diphtheria, repeated complaints have been made of the disease breaking out in houses near to stinking ventilators, and that two such gratings have been closed in consequence by order of the Local Board. As many of our readers are connected in one way or another with local authorities entrusted with the care of sanitary matters, it may be useful to say that the remedying of a nuisance or danger from badly smelling road gratings seems to lie entirely within the power and discretion of Local Boards of Health. The principle advocated by Professor Attfield has already received a certain amount of recognition in the official publications of the Local Government Board, and Sir Robert Rawlinson, the Chief Engineering Inspector to the Board, has advised, where it is desired to prevent the escape of sewer gas through road gratings, the use of a supplementary vent pipe, at least four inches in diameter and terminating at a considerable elevation, though where this is carried out he does not think it necessary to close the gratings. Sir Robert very distinctly recommends the prevention instead of the promotion of free ventilation in sewers, the official drawings showing the adaptation for this purpose of flap doors against the end of a sewer at every tumbling bay throughout the whole length of the sewer.

* * *

We are pleased to be in a position to announce that Mr. Sidney Plowman has been appointed Joint-Lecturer on Materia Medica and Therapeutics in the Medical School of St. Thomas's Hospital.

* * *

The vacancy in the office of Analyst to the Government of Victoria, caused by the death of Mr. Johnson, has been filled by the appointment to it of Mr. C. R. Blackett, formerly President of the Pharmaceutical Society of Victoria. The government has made a condition that Mr. Blackett shall not undertake any private practice that will interfere with his official duties.

Proceedings of Scientific Societies.

ROYAL SOCIETY OF EDINBURGH.

At the evening meeting, held on July 18, the following among other papers were read :—

"On Some Vapour Densities at High Temperatures," by Alex. Scott, M.A., D.Sc. The author gives in this paper the results of a series of vapour-density determinations made by Victor Meyer's method in a platinum apparatus at a temperature above the melting point of cast iron. The conclusions drawn from the experiments are, that at that temperature the molecules of potassium and sodium are monatomic, like those of mercury and cadmium, and that the formulæ usually employed for the chlorides, bromides and iodides of cæsium, rubidium, potassium, manganese, silver and lead, truly represent the molecular weights. The bromide and iodide of cadmium undergo dissociation to a considerable extent, as do both chlorides of mercury to a larger extent ; but even in their case the dissociation is not nearly so complete as in the well-known case of mercuric sulphide. The molecular weights thus determined point to the true formulæ for ferric and chromic chlorides being $FeCl_3$ and $CrCl_3$ respectively.

Professor A. Crum Brown gave a brief communication on "Ferric Ferricyanide as a Reagent for Detecting Traces of Reducing Gases." It was shown that ferric ferricyanide is a much more delicate reagent than the chromate usually employed. The test is applied by exposing paper moistened with the ferric salt to the suspected atmosphere, when the development of the blue coloration indicates the least trace of reducing gas.

ROYAL INSTITUTION OF GREAT BRITAIN.

Recent Researches on Meteorites.

BY PROFESSOR DEWAR, M.A., F.R.S., M.R.I.

Professor Dewar explained that Mr. Gerrard Ansdell and himself had been engaged in an examination into the gaseous constituents of meteorites, and he proposed to abstract the results of the investigation, which had been laid before the Royal Society.

The nature of the occluded gases which are present to a greater or less extent in all meteorites, whether belonging to the iron, stony, or carbonaceous classes, has engaged the attention of but few chemists. It is, nevertheless, an especially interesting and important subject, owing to the uncertainty which still exists as to the origin of these celestial bodies.

Graham (*Proc. Roy. Soc.*, vol. xv. (1867), p. 502) was the first who made any experiments in this direction, when he determined the gases occluded in the Lenarto meteoric iron, which yielded 2·85 times its volume of gas, 86 per cent. of which was hydrogen, and 4·5 per cent. carbonic oxide. He was followed in 1872 by Wöhler (*Pogg. Ann.*, vol. cxlvi. p. 297) and Berthelot (*Compt. Rend.*, vol. lxxiv., pp. 48, 119), who estimated approximately the gases contained in the Greenland Ovifak iron. These gases consisted of about equal parts of carbonic acid and carbonic oxide ; the celestial origin of this iron is, however, very doubtful.

In the same year (1872) the American chemist, Mallet (*Proc. Roy. Soc.*, vol. xx., p. 365), made a very complete determination of the gases occluded by the Augusta Co., Virginia, meteoric iron, which, however differed very considerably from Graham's results. He obtained an amount of gas equal to 3·17 times the volume of the iron, made up of 35·83 per cent. of hydrogen, 38·33 per cent. carbonic oxide, 9·75 per cent. of carbonic acid, and 16·09 per cent. of nitrogen.

Wright and Lawrence Smith followed Mallet, and our present knowledge of this interesting subject is principally due to these American chemists. They have taken advantage of the numerous meteoric masses which have fallen from time to time throughout America, and which can easily be obtained in sufficient quantity for complete and accurate observations on their gaseous constituents.

Wright contributed several papers to the *American Journal*, in 1875 and 1876, and according to his analyses, the total volume of gas occluded and the composition of the same differs considerably in the two principal classes of meteorites. He found the total volume of gas extracted was much greater in the case of the stony meteorites than in the iron ones, the principal characteristics of these gases being, that in the former the carbonic acid greatly predominated, accompanied by a comparatively small amount of carbonic oxide and hydrogen, whereas in the latter the carbonic acid never exceeded 20 per cent., the carbonic oxide being, as a rule, considerably more than this, and the hydrogen sometimes reaching as high as 80 per cent.

It is impossible, however, to arrive at anything more than general conclusions as to the total amount of gas given off by any special meteorite, or its composition, for, as shown by Wright and confirmed by Mr. Ansdell and the lecturer, both the total quantity and composition of the gases vary very considerably according to the temperature at which they are drawn off.

Wright found a notable quantity of marsh-gas in all the stony meteorites which he examined, though not a trace in any of the iron ones; this seemed to be a distinctive difference between the two classes of meteorites, but subsequently Dr. Flight, of the British Museum (*Phil. Trans.*, vol. clxxiii. (1882), p. 885), found marsh-gas in a specimen of the Cranbourne siderite, so that it is evident certain of the iron meteorites also contain this gas.

Lawrence Smith (*Amer. Journ.*, 1876) confined himself principally to an examination of the graphite nodules which are frequently found imbedded in the iron meteorites, and to the nature of the carbon in the so-called carbonaceous meteorites. He extracted the organic or hydrocarbon-like bodies by means of ether, but did not determine the gases given off on heating. Previous to this, Roscoe (*Pro. Phil. Soc. Man.*, 1862) had obtained the same hydrocarbon-like body by exhausting the Alais meteorite with ether, but the quantity he had to work upon was so small that he could not make a very complete examination.

These are some of the principal points that have been made out with regard to the gases occluded by meteorites. The results, however, are so comparatively few, that it was thought worth while to take the opportunity which presented itself, of having several good specimens of meteorites to confirm these results, and, if possible, add something to our present knowledge of the subject.

The investigation may be divided into five parts, having the following objects in view: firstly, the confirmation of previous results by the examination of some well-known meteorite; secondly, the analysis of several whole meteoric stones, whose interior had never been exposed to the effects of the atmosphere, by reason of the characteristic coating of glaze; thirdly, the examination of a celestial graphite nodule, taken from the interior of an iron meteorite; fourthly, the comparison of some meteorite of the carbonaceous class with the above; and fifthly, the examination of different terrestrial graphites.

The method employed for the abstraction of the gases was exactly the same in every case, so that a short description will suffice for all. The temperature was kept as nearly as possible the same in every experiment, but no doubt differences of many degrees occurred in some of the experiments, which was unavoidable in using an ordinary combustion furnace.

The meteorite or graphite, as the case might be, was broken up into a coarse powder, introduced into a convenient length of combustion tubing, and connected up with a Sprengel pump, a small bulb-tube immersed in a freezing mixture intervening, so as to retain any mois-

ture or condensable volatile products that might come off. The tube was first thoroughly exhausted and then heated in an ordinary gas combustion furnace to a low red heat. The gases, during the heating, were gradually drawn off by the Sprengel pump, and when the tube had remained for several minutes at a low red heat it was completely exhausted. The total quantity of gas collected was in every case used for the analysis.

The "Dhurmsala" specimen was an ordinary fragment of a much larger original mass, but in the case of the Pultusk and Mocs meteorites, complete stones were fortunately obtained, weighing respectively 57 and 103 grams, having the characteristic black glaze on their surfaces.

Such a large quantity of water was condensed in the bulb tube in heating the Dhurmsala meteorite, it being the first one examined, that it was thought it might be principally due to the great absorptive power of these porous bodies, and that therefore the moisture might have been condensed in the pores of the meteorite from the surrounding air. The Pultusk and Mocs specimens appeared to be especially adapted for ascertaining whether this was the case, as the complete covering of black glaze would probably prevent the moisture from penetrating to the interior of the stones. The fragments of these stones were therefore transferred as quickly as possible to the combustion tube after they had been broken up. Notwithstanding these precautions, fully as much water was condensed from them as from the Dhurmsala specimen, which seems to suggest that the water is really combined in some form in the stone and not obtained directly from the surrounding atmosphere, although it must be admitted that the glaze on both the stones was not of a very glossy character, and did not have the appearance of being absolutely impervious to moisture.

The pumice-stone was examined merely with a view to comparing the gases occluded by a porous body of volcanic origin with those contained in meteorites. The sample taken was a fresh piece of stone, which had not been dried or purified in any way.

It is evident that it differs considerably from the meteoric stones, the total occluded gas being very small, only about half its volume, the carbonic acid at the same time being much less, with a proportionate increase in the carbonic oxide.

The general method of analysis was as follows, and the accuracy of the results was confirmed by varying in some cases the method of separating the gases. The carbonic acid was first removed from the mixture by caustic potash, the carbonic oxide being then absorbed by subchloride of copper, and the remainder of the gases exploded with excess of oxygen. The carbonic acid formed was again removed by caustic potash, and the excess of oxygen by alkaline pyrogallate, the residue being taken as nitrogen. The relative quantities of marsh-gas and hydrogen were calculated from the total diminution after explosion, and the amount of carbonic acid formed :—

	Sp. gr.	Occluded gases in vols. of the meteorite.	Percentage composition.				
			CO_2.	CO.	H.	CH_4.	N.
Dhurmsala . .	3·175	2·51	63·15	1·31	28·48	3·9	1·31
Pultusk . . .	3·718	3·54	66·12	5·40	18·14	7·65	2·69
Mocs.	3·67	1·94	64·50	3·90	22·94	4·41	3·67
Pumice-stone .	2·50	0·55	39·50	18·50	25·4	—	16·60

It will be seen that the above numbers are quite confirmatory of Wright's results, the carbonic acid in the three meteorites examined being by far the largest constituent, while marsh-gas in considerable quantity was found in all. The percentage of this latter gas is somewhat higher than that found by Wright in the stony meteorites he examined, but this is probably due to the fact that a rather higher temperature was employed by the lecturer to drive off the gases. This supposition seems to be confirmed on considering the analysis of the Poltusk meteorite ; for whereas Wright's abstracted gas only reached 1·75 times the volume of the stone, the total quantity of gas obtained by the lecturer was twice as much or equal to 3·54 times its volume.

It is therefore unquestionable that marsh-gas is given off on heating these meteoric stones, but whether it exists as such occluded in the material, or whether it is formed by some chemical decomposition of some organic constituent of the mass, is by no means clear.

Wright came to the conclusion "that the marsh-gas really existed as such in the stony meteorites, as the temperature at which it was driven off would be too low for its formation," at the same time he thinks it quite possible that "at very much higher temperatures, in the reaction by which the carbonic acid is broken up by the iron, a portion of the carbon might combine with the hydrogen present to form marsh-gas."

Knowing the great absorptive power for gases possessed by porous bodies generally, it was thought advisable to determine directly what this absorptive power was in the case of these stony meteorites, which are of such an eminently porous nature.

For this purpose the powdered Dhurmsala meteorite, from which the gases had been removed, was left in moist air under a bell-glass, for different periods of time as tabulated below, the gases being drawn off at a low red heat after each period :—

	Occluded gas in vols. of the meteorite.	CO_2.	CO.	H.	N.
After 24 hours. . .	0·61	54·0	—	42·4	3·6
After 6 days more .	2·47	47·0	5·0	47·0	1·0
After 8 days more .	0·63	96·1	2·0	1·5	—

The absorption of water and gases evidently went on tolerably rapidly for the first seven days, but after the second heating of the meteorite, its porosity seems to have been affected in some way, for after a further period of eight days, it was found to take up only about a fourth of the quantity of gas which it had absorbed in the previous six days.

The actual amount of water given off after this exposure to a moist atmosphere was considerably less than what was obtained in the original heating of the meteorite, and from this it was inferred that the water is chemically combined in the stone. It would be difficult to explain, otherwise than by chemical combination, the power by which the water is retained by these meteorites, as it is not given off until a very high temperature is reached. In any case it is clear that the hydrogen must come from the action of water on the iron-nickel alloy, or finely disseminated carbon. Greville Williams has pointed out that the large amount of hydrogen obtained from heating finely divided zinc-dust is not due to free hydrogen, but to the action of the zinc on the hydrated oxide of zinc.

To pass on to the consideration of the various graphites examined. The celestial graphite was a perfect oblong nodule weighing 30 grams, which had been taken from the interior of a mass of the Toluca meteoric iron. It had a uniform dull-black colour, except at one end where there was a slight incrustation of sulphide of iron. Its fracture showed a uniform dull-black, compact mass; it was easily pounded up in a porcelain mortar, and formed a fine granular powder without any lustre.

On extracting the gases from this specimen a considerable quantity of marsh-gas was obtained, so that it appeared most important to compare it with some samples of terrestial graphites, more especially as the occluded

gases had never, as far as the lecturer was aware, been determimed in these bodies.

For this purpose four samples of native graphites were obtained. The Cumberland graphite was a magnificent specimen of the original Borrodale, and had been in a private cabinet for over fifteen years. It had the characteristic dense homogeneous structure and brilliant external lustre of the graphites coming from this district. The Siberian example was from the Alexandref Mine; its structure was columnar and striated, with little external lustre; it was rather more easily broken up than the Borrodale, but formed the same dull black powder. The specimen from Ceylon was of the type usual to that island; highly lustrous and flaky, breaking up very easily, and forming small shining plates when ground up. The last sample, which was from the same cabinet as the others, but whose origin was unfortunately unknown, had a dull external surface, was exceedingly porous, and much more brittle than any of the previous ones, grinding up very easily into a dull black powder. It had more the appearance of the celestial graphites, which was heightened by having slight incrustations of sulphide of iron on its surface. Its low specific gravity also shows it to be some exceptional variety.

It seemed most important in connection with this subject to examine some matrix with which the graphites are usually found associated. These rocks are very variable, but consist principally of a kind of decomposed trap or gneiss. A good specimen was obtained of semi-decomposed gneiss from Canada with a considerable quantity of graphite disseminated throughout the mass, and also several samples of Ceylon graphite imbedded in its matrix, which in this case consisted of felspar and quartz.

The results, as tabulated below, confirm Wright's analyses of several trap rocks, in which he found principally carbonic acid and hydrogen. The small quantity of marsh-gas no doubt comes from the disseminated graphite, but the presence of the hydrogen is more difficult to explain, and requires further investigation.

	Sp. gr.	Occluded gases in vols. of the graphite.	CO_2.	CO.	H.	CH_4	N.
Celestial graphite	2·26	7·25	91·81	—	2·50	5·40	0·1
Borrodale ,,	2·86	2·60	36·40	7·77	22·2	26·11	6·66
Siberian ,,	2·05	2:55	57·41	6·16	10·25	20·33	4·16
Ceylon ,,	2·25	0·22	66·60	14·80	7·40	3·70	4·50
Unknown ,,	1·64	7·26	50·79	3·16	2·50	39 53	3·49
Gneiss ,,	2·45	5·32	82·38	2·38	13·61	0·47	1·20
Felspar. . . .	2·59	1·27	94·72	0·81	2·21	0·61	1·40

On comparing these samples of graphite, it will be seen that the Borrodale and the Siberian give off about the same total volume of gas, that the celestial and the unknown graphites closely approximate each other in this respect, yielding more than double the volume of the others, and that the Ceylon sample stands alone in yielding a very minute quantity. All the terrestrial samples, except that from Ceylon, are alike in giving off a very considerable quantity of marsh-gas, though they differ somewhat in the actual quantity, and it is evident that although the celestial graphite contains a considerable amount, it is very much less than that yielded by the terrestrial samples.

A few tentative experiments were made to ascertain the absorbing power for gases of this celestial graphite. For this purpose dry carbonic acid, marsh-gas, and hydrogen were respectively drawn through the tube containing the previously exhausted graphite for twelve hours in the cold, the gases being pumped out at a low red heat after each treatment with the dry gas. After the carbonic acid treatment the volume of gas collected was only 1·1 times that of the graphite, containing 98·4 per cent. of carbonic acid; after the marsh-gas the volume of the gas was only 0·9 that of the graphite, containing 94·1 per cent. carbonic acid; and after the hydrogen the volume of the gas collected was only 0·17 times that of the graphite, containing 95·0 per cent. of carbonic acid. It is therefore evident that the large quantity of gas occluded in celestial graphites cannot be explained by any special absorptive power of this variety of carbon. In view of the large and varying percentages of marsh-gas in the gaseous products of all these graphites, it appeared of especial interest to ascertain whether the quantity of marsh-gas extracted coincided in any way with the hydrogen obtained by their combustion. All the samples were therefore submitted to ultimate analysis, with the following results :—

	Percentage composition.		
	Hydrogen.	Carbon.	Ash.
Celestial graphite . .	0·11	76·10	23·50
Borrodale ,, . .	0·11	94·76	4·85
Siberian ,, . .	0·17	79·07	20·00
Ceylon ,, . .	0·017	90·90	9·08
Unknown ,, . .	0·246	78·51	21·26

These analyses do not seem to point to any very definite conclusion as to the origin of the marsh-gas. The unknown graphite, which contains the largest percentage of marsh-gas, certainly comes out far the highest in hydrogen, and the hydrogen in the Ceylon graphite also bears a certain relation to the small quantity of marsh-gas it contains, but the first three samples are very similar to each other in the amount of hydrogen they contain.

In order to get some further insight into the origin of this marsh-gas in the celestial graphite, about 2 grams of the original nodule were very finely ground up and digested for several hours with strong nitric acid. After being thoroughly washed from every trace of nitric acid and dried at 110° C., it was again submitted to analysis, with the result that the amount of hydrogen remained exactly the same as before, proving that it existed in the form of some very stable compound in the graphite.

(*To be continued.*)

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

As an outcome of the recent annual dinner, Mr. Alderman Cox, J.P., invited a party of chemists for a trip up the river Arun in his steam yacht *Lissie* on July 8. The party, numbering sixteen, left Brighton by the 10.15 train, and on arriving at Arundel, was welcomed on board by the worthy alderman. When proceeding up the river, the party had a grand view of Arundel Castle and the Duke of Norfolk's beautiful deer park; afterwards landing at North Stoke, the party walked to Amberley, and visited the ancient ruins of the castle, the church, etc. On returning, the yacht steamed down the river until a shady place in the park was found, when the party landed, and had luncheon in picnic fashion; after luncheon, Mr. W. D. Savage proposed, and Dr. Ewart seconded, a toast, "The Health of Mr. Alderman Cox," to which Mr. Cox responded. When again on board, the yacht went down the stream to Arundel, Mr. Long meanwhile entertaining the company with songs, etc. At Arundel tea was provided at the "Norfolk Arms," and after tea the members viewed the Roman Catholic Church, strolled in the park, etc., and returned to Brighton in the evening having spent a most enjoyable day.

Parliamentary and Law Proceedings.

The Leith Depôt Case under the Pharmacy Act. Reversal of the Sheriff's Judgment on Appeal.

On Wednesday last, the 20th inst., before Lord Justice Clerk Moncrieff and Lord Young, in the High Court of Justiciary, Edinburgh, an appeal was heard at the instance of Andrew W. Gray, Andrew Gray, William Taylor, Jane Maria Gray, David Ovens, James Fettes, and Marjory F. J. Fettes, Appellants, against Richard Bremridge, Respondent, in respect to a judgment delivered by Sheriff Rutherfurd on the 1st of July, inflicting penalties on the appellants for offences against the Pharmacy Act.

Council for the appellants, Mr. Macintosh, Dean of Faculty, and Mr. Orr, instructed by Wishart and Macnaughton, W.S. Counsel for the respondent, Mr. A. Grahame Murray and Mr. Shaw, instructed by Mr. P. Morison, S.S.C.

A case for the opinion of the High Court of Justiciary was stated by Sheriff Rutherfurd, the essential points in which are as follows :—

This is a cause in which the respondent, with concurrence of the Procurator-Fiscal, charges the appellants with contravention of the "Pharmacy Act, 1868" (31 and 32 Vict., cap. 121).

The complaint was called upon June 27, 1887, when the appellants objected to the relevancy of the first charge, on the ground that it did not set forth that each or all of the appellants had, as an individual or as individuals, put up, used, or exhibited, the title chemist and druggist, or had, as an individual or individuals, issued to the public circulars, labels and advertisements bearing the words chemist and druggist, and that the complaint charged was in truth a complaint against the Leith Depôt, Limited, in respect that the said company put up, used, or exhibited the title chemists and druggists in the manner set forth, and also issued to the public, in connection with the business of the company, circulars, labels, or advertisements, bearing the words chemists and druggists, and that such a complaint was irrelevant.

The appellants' counsel also objected to the second and third charges in the complaint, on the ground that more than six months had elapsed since the date libelled, and that the proceedings were therefore incompetent by reason of the provisions of the 13th section of the Act 15 and 16 Vict., cap. 56.

No objection was stated to the fourth charge, and the fifth was withdrawn.

Having heard counsel for both parties I repelled the objection to the relevancy of the first charge in the complaint for the reasons stated in my opinion, and the parties have agreed that it shall form part hereof.

I sustained the objections to the second and third charges.

The appellants having pled not guilty, evidence was then led by both parties, and the following are the facts proved, so far as affecting the first charge in the complaint :—

None of the appellants are duly qualified chemists and druggists under the statute.

They are the sole shareholders of the Leith Depôt, Limited, registered under the Companies Acts, 1862 and 1867.

The company had two shops, one at No. 49, Leith Walk, and the other at No. 33, Ferry Road, Leith.

The objects for which the company was established, as set forth in the Memorandum of Association which was produced, are the carrying on of the business of wholesale and retail chemists and druggists, as well as that of selling and dealing in tea, tobacco, spices, perfumery, and generally articles for domestic use or ornament.

In addition to a wholesale trade in articles such as chemical food, syrups and tinctures, but not in drugs or poisons, the business of an ordinary retail chemist and druggist was carried on at each of the shops.

The title exhibited above both shops is "The Leith Depôt, Limited, Wholesale Chemists, Druggists and Tea Merchants."

All circulars, labels, and advertisements bore the words, "The Leith Depôt, Limited, Wholesale Chemists, Druggists, Tea Merchants." In the circulars and advertisements prominent reference was made to the retail and dispensing business carried on, and it was alleged that goods were retailed at wholesale prices.

The shop at 49, Leith Walk was under the management of the appellant Mr. Andrew W. Gray, one of the shareholders, and an assistant, Mr. Nicholas Dodds, who is a duly qualified chemist and druggist.

The shop at No. 33, Ferry Road was managed by an assistant, Mr. Henry Forewell, who is a duly qualified chemist and druggist.

In respect of the evidence adduced I found the first charge proved, and found the appellant Andrew W. Gray liable in the statutory penalty of £5 ; and each of the other appellants in the modified penalty of 10*s*.

The questions of law for the opinion of the Court are—

1. Whether the first charge in the complaint is or is not relevant?

And, assuming the first query to be answered in the affirmative,

2. Whether the use and exhibition of the title chemists and druggists by the appellants, as aforesaid, was or was not a contravention of the 15th section of "The Pharmacy Act, 1868"?

This Case is stated by me,

AND. RUTHERFURD,

Sheriff-Substitute of the Lothians and Peebles.

After hearing the arguments of Counsel, which will be published next week, the Court delivered judgment as follows :—

Judgment.

The Lord Justice Clerk : My Lords, this has been an interesting discussion, and the subject is one that undoubtedly deserved and required consideration. Fortunately for us, the principles involved in the debate have been the subject of a judgment in the House of Lords of great weight and authority, and I am of opinion, though not without some difficulty, that the principles announced in that judgment must govern this case, and that, consequently, the conviction cannot be sustained. I do not require to go at any length into the grounds upon which the controversy has been maintained. The Act is a very defective Act, and the state of facts disclosed in this case is simply not provided for. The draughtsman of the statute, whoever he was, had not taken into account that some of the acts provided against in this statute might be acts authorized and enjoyed by persons who could not acquire the statutory qualification, and who could carry on such businesses as are there dealt with, through the agency of others who are qualified, and that truly is the origin of all the difficulty here. It was a category that should have been provided for, and a reasonable provision would have been that if a business was carried on by persons who were not themselves capable of acquiring the qualification, or not expected to acquire it, it should be sufficient that they carried on the business and kept open shop solely by persons who had acquired the qualification. That was what was required; but there is no provision of that kind in the statute. It could only be reached by inference, and inference, I am bound to say, not of the clearest or most transparent description. It has been found by the judgment of the House of Lords, that the word "person" in this Act signifies what is called a natural person, that is to say an individual, and not a collective body like a partnership, or a company or corporation. Their Lordships came to that result, and I do not see that we can well differ from it. The result is that this Act does not apply to a

partnership at all, and that is the view at which I arrive. I do not think it applies in any of its parts. The result of the judgment of the House of Lords is that no liability could be inferred under the penalty clauses of this statute, in respect of the offences prohibited by it. I think that is the necessary result of the limitation of the word "person" which the judgment of the House of Lords has imposed. I very much doubt whether the corporation or a member of the corporation would be responsible even though the person who carried on the business was not qualified. That may be inferred, but it is not said in the Act. I should reserve my opinion upon it, but I think it is open to that observation. I do not think it necessary to say more upon this matter. I think the judgment of the House of Lords leaves us no alternative, and I think we should decide it in conformity with that judgment.

Lord Young: I am of the same opinion. I think the judgment of the House of Lords conclusively governs this case; but I confess I am not sorry that the House of Lords arrived at the conclusion at which they did, and that we have an opportunity now of expressing our concurrence in it. We arrive at the same conclusion not only in deference to the judgment of the House of Lords, but also because we approve of the grounds upon which they proceeded. It is a matter of considerable importance, no doubt—of first-rate importance to the public, that drugs and chemicals should only be dispensed by qualified persons. I am very doubtful whether any special legislation is necessary to that end, or whether the ordinary competition in that as in other trades would not secure all that the public desires, but assuming that a qualification ought to be exacted by the Legislature from those who compound or sell drugs, I should be disposed to go no further than is manifestly necessary to that end, by construction of statute or otherwise, and carefully avoid putting any restraint upon the trade. The public are interested in having such drugs or chemicals as they require at reasonable prices, and it is matter of common knowledge that most extravagant prices are exacted, and from very poor people who have occasion to go to ordinary chemists' shops for the drugs which are prescribed to them. I was informed, as a mere illustration, by a physician of eminence and in large practice that a patient to whom he had given a prescription complained to him after a while of the cost of the article. He had to get his little phial filled repeatedly, and the charge to him upon each occasion was 2*s*. The physician compassionated the poor man, and told him the two ingredients of which the article was compounded and directed him to get one in one chemist's shop and another in another. The result was that he got for 3*d*. what made up some dozen bottles of the medicine sold to him at 2*s*. each. It is not unreasonable that the public should desire that some check should be put upon such high charges by chemists. There is no grudging of the payment made for professional skill, but where it is extended to matters of that sort, the public are interested in companies, even joint stock companies or associations, taking the sale of drugs into their business, being careful that that part of their business is conducted by duly qualified people; and I suppose this corporation introduced the sale of such articles into their business for that reason, and conducting that part of the business by means of duly qualified people, they were able to supply the public upon much more reasonable terms. I thoroughly concur in what Lord Selborne said upon this head, where the very statute which is before us was sought to be put in force so as to terminate any such trade by corporations who could not be qualified chemists and druggists. At p. 867 of the volume where the case in the House of Lords is reported, after noticing that drugs and chemicals were extensively sold by joint stock companies before the Act, who kept open shop for their sale, proclaiming the fact and selling these things in open shop, his Lordship says:—"That having been the state of the law and the facts I think it would be wrong for your Lordships without necessity to impose upon the word 'person' used in such a context as that in which you find it here, a construction which might render illegal that mode of carrying on the business of chemists and druggists by such corporations, although there is no direct reference from the beginning of the Act to the end to any such bodies or to that kind of case." Lord Blackburn says very emphatically the same thing. He says, "My Lords, my conclusion, looking at this Act, is that it is clear to my mind that the word 'person' here is so used as to show that it does not include a corporation, and that there is no object or intention of the statute which shows that it is requisite to extend the word to a sense which probably those who used it in the Legislature were not thinking of at all. I do not think that the Legislature was thinking of what is corporate at all. That leads to the conclusion that a corporation is not to be described as a person. If the prohibition of the Act was directed against a corporation as a person, if in the language of the clause prohibiting a thing to be done, the word 'person' was used in a sense which included a corporation—which it might—then I should have had no difficulty in including it in the clause imposing a penalty or any other punishment that might be imposed upon a corporation." But he says the two things are to be taken together, and if the word "person," in the clause prohibiting the act and declaring it to be illegal does not include a corporation, neither is it included by the same word when used in the other clause—the 15th—which imposes the penalty. He says, "The 15th section imposes the penalty, and the 15th section, in imposing the penalty, repeats the words which make the thing unlawful. I think these two sections must be construed together and looked at together." Now, the result was that the prosecution for a penalty was dismissed, and the judgment of the magistrate who refused to convict was affirmed; but that was not upon the ground that the corporation might not have incurred the penalty, but that the word "person" in the clause prohibiting the thing, in consequence of which the penalty was to be incurred, did not include a corporation. Now, I can hardly characterize the attempt which is now made to attain the same result in another way, as other than a contrivance. I should not even speak of the contrivance with any language of approbation. It was held upon the merits that by the statute corporations are not intended to be prohibited from keeping open shop for the sale of drugs, and that upon grounds of public policy, without necessity an end is not to be put to a trade that was carried on extensively by corporations before. Well, what is the contrivance? If they cannot complain of the corporation, because the statute does not prohibit a corporation from carrying on such a trade, they say "Oh! we will prosecute the whole individual members composing the corporation." That would lead to the result, which Lord Selborne, then Lord Chancellor, so strongly deprecated, as to terminate without any necessity a trade which was extensively and lawfully carried on before. You cannot terminate it by prosecuting the corporation; it is entitled to do the thing; but you can terminate it by prosecuting each of the seven or seventy or seven hundred members composing the corporation, and so attain the same result. I have no hesitation, whatever, in dismissing the one complaint, and that entirely upon the same grounds upon which the other was dismissed. I repeat, and your Lordship has noticed it, Lord Selborne dwells upon it, and so does Lord Blackburn—that the real purpose and object of the statute is the safety of the public. The trades union interest is not one which I would look upon very favourably. The public interest is entirely protected by the provision that if this business is carried on in any shop, the drugs shall be compounded and dispensed and everything in which the safety of the public or the

interest of the public is concerned shall be done by duly qualified persons. There may be a difficulty in the case of an assistant, dispensing or compounding drugs, who is not duly qualified, but the language of the noble and learned Lords in the case cited points to the prosecution of such an assistant under the statute. In that way the public interest and safety are entirely attended to and preserved. As I have already stated, I am very glad that we have an opportunity of expressing this view of the law, which I think is one beneficial to the public, and quite consistent with the public safety. I am for quashing this conviction.

Lord Craighill: I concur. I think the decision in this case is governed by the decision of the House of Lords, and that the Act of Parliament does not apply to corporations. I have nothing further to add.

The Lord Justice Clerk: Then your Lordships will sustain the appeal, and quash the conviction.

Expenses were allowed to the appellants.

Alleged Offence against the Pharmacy Act.

At the Manchester County Police Court, on Thursday, the 14th inst., Walter James Smith, chemist, was charged with a breach of the 17th section of the Pharmacy Act.

Mr. Crofton, who prosecuted, stated that the defendant was employed in the shop of Mr. J. R. Lateward, chemist and druggist, Oldham Road, Newton Heath, and the offence with which he was charged was non-compliance with the 17th section of the Pharmacy Act, which provided that no poison was to be sold to any person not known to the seller unless introduced by some person known to the seller. On June 20 a woman named Maria Davenport purchased sixpennyworth of vermin killer, which was a preparation of strychnine, with which she afterwards poisoned herself. On inquiry being made it was found that the poison had been purchased by Mrs. Davenport from the defendant, who, it was contended, did not know the woman within the meaning of the Act. He knew her by sight only, and there was no introduction of her to the defendant by another person known to him.

Mr. Cobbett, who appeared for the defendant, said it was perfectly true that his client did not know the name of the woman to whom he sold the poison, but he had known her as a frequent customer at Mr. Lateward's shop for about twelve months, and also knew that she was the wife of the man who lived at Bagley Fold Farm, though he did not know what his name was. When she purchased the poison, Mrs. Davenport gave her correct name, and stated her address as Bagley Fold Farm, whereas, at that time she was staying with her mother in Oldham Road. He (Mr. Cobbett) contended that his client really had the knowledge of the purchaser which was required by the Act—the knowledge which enabled him to identify the person who had bought the poison.

The Stipendiary asked what was the degree of knowledge that a man must have, for, in his opinion, it was clearly a question of degree?

Mr. Crofton said he must know that the entry of the name and address in the book was true, and not fallacious. In the present instance the address entered was Bagley Fold Farm, whereas the woman at the time was staying in Oldham Road.

Mr. Cobbett said that though the defendant did not know Maria Davenport was her name, he knew the personality. He explained that at the time the woman was staying with her mother, her furniture remained at the farm, of which he believed she was the tenant up to the time of her death.

The Stipendiary thought the defendant could fairly say to the Bench that this person was not unknown to him, and the case would be dismissed, but, as they considered the police were justified in bringing the matter forward, the defendant must pay the costs. He should like it to be distinctly understood that the onus was thrown upon the seller of the poison to show that the person to whom it was sold was not unknown to him.

Poisoning by Black Drop.

Dr. G. Danford Thomas held an inquiry on Monday last at the University College Hospital, Gower Street, into the circumstances attending the death of Robert Howard Hutton, aged 47, the eminent bone-setter, of 36, Queen Anne Street, Cavendish Square.

Mr. Maynard, solicitor, appeared for the relatives of the deceased.

The identification was proved by Miss Elizabeth Hutton, of 71, Euston Square, sister of the deceased.

Richard Shurman, who described himself as a professional rubber, stated that he had known the deceased for the past thirteen years. He (the witness) was in the habit of attending every morning professionally to rub the deceased's leg. On Saturday he arrived at usual, about a quarter past eight, and as soon as he got into the room Mr. Hutton asked him to give him his draught off the table.

The Coroner: What was it?

Witness believed it was an aperient; the deceased frequently took one, but was not under any medical man. According to instructions witness poured out part of the contents of the bottle into a glass which the deceased held in his hand. As he put the bottle back he noticed a peculiar look on Mr. Hutton's face, and then saw the word "Poison" on the label. He then said: "Governor, I think I have made a mistake." The deceased then said either "I am poisoned," or "You have poisoned me." He would not be certain which. He then ran to the housekeeper and obtained some salt and water and some mustard and water, but on bringing it up deceased refused to take it. In the meantime he had got out of bed, and sat on a chair, and afterwards slid on to the floor. A doctor was then sent for, and ultimately an ambulance, on which he was conveyed to the hospital. The bottles were here produced, one an empty one, having contained according to the label "Genuine Black Drop," one drop equal to 3 grains of laudanum, and the other full, containing a black draught.

Jane Chambers, the housekeeper, proved that Mr. Hutton was in the habit of taking a blue pill at night, and did so on Friday when he came home at half-past twelve, and told her he should take the draught in the morning.

Dr. Edward Bellamy stated that when he was called to the case at half-past eight on Saturday morning he found the deceased almost comatose. He tried to administer an emetic, but was not able, as Mr. Hutton was a most powerful man. He then sent for a neighbour, Dr. Ralfe, at the same time going for a stomach-pump and battery. The deceased, however, refused to take anything, and they obtained the assistance of the police with an ambulance, and had him conveyed to the hospital.

Dr. Ralfe corroborated, and Dr. Arch, of the above institution, stated that on admission the deceased was quite insensible, black in the face, and asphyxiated. The usual remedies were applied without intermission, but he died the same evening at half-past six from narcotic poisoning.

Frederick Edward Mills stated that he was continually with the deceased, and had bought the blue pill and black draught, but knew nothing of the other bottle.

The Coroner: Did he ever say anything about committing suicide?

Witness: Oh! bless you, no, sir; he was looking forward to his shooting on August 12, and had sent twelve or fourteen dogs into the North for that purpose.

The Coroner having summed up, the Jury returned a verdict of death from misadventure.

The Supply of Teething Powders.

Mr. T. C. Brian (Plymouth Coroner) held an inquest on the 15th inst. at the Railway Hotel, Mutley, on the body of Claude Brend, eight months old.

Eunice Brend, grandmother of the deceased deposed to the child's unhealthy condition since birth. On Wednesday it had suffered from diarrhœa, and at night she had given it some teething powder, as she thought that its teeth had caused the illness. On Thursday, at 5 a.m., the child died.

Mr. Edlin, F.R.C.S., stated that he saw the deceased at 6·30 a.m. on Thursday; it had died from exhaustion, caused by the diarrhœa. The powder was not the right sort to have given; he had gone to Mr. Park, from whom it had been procured, and the chemist had not known that anything besides teeting was the matter with the child; but the last witness told the doctor that she had let Mr. Park know of the child's illness.

The Jury wished Mr. Park to be called, and Mrs. Brend was re-examined in his presence. She stated that she had told him that the child was suffering from diarrhœa, and had been so for two days; and she also thought the child was teething.

Mr. Park, chemist, 1, Mutley Plain, stated that the witness had asked for teething powder, and as far as he could remember she had not mentioned diarrhœa. He gave her a compound—James's powder—which he would not have done had he known of the child's illness.

The Jury returned a verdict of death from exhaustion, caused by violent diarrhœa, and accelerated by the powder. They considered that the mother and grandmother of the child should have procured medical aid, and they exonerated Mr. Park from all blame.—*Western Morning News.*

Obituary.

Notice has been received of the death of the following:—

On the 2nd of June, Mr. Robert Smith, Chemist and Druggist, Newport, Isle of Wight. Aged 60 years.

On the 11th of June, Mr. Thomas Houghton, Pharmaceutical Chemist, High Street, St. Clement's, Oxford. Aged 74 years. Mr. Houghton had been a Member of the Pharmaceutical Society since 1853.

On the 15th of June, Mr. Henry William Thomas, Chemist and Druggist, Aberporth, Cardiganshire. Aged 76 years.

On the 18th of June, Mr. Thomas Hall, Chemist and Druggist, Breckfield Road, Liverpool. Aged 54 years.

On the 19th of June, Mr. Reuben Milton, Chemist and Druggist, High Street, Exeter. Aged 68 years.

On the 21st of June, Mr. Robert Foulds, Chemist and Druggist, Pitt Street, Liverpool, Aged 57 years.

On the 24th of June, Mr. William Slack, Chemist and Druggist, Doncaster. Aged 72 years.

On the 24th of June, Mr. Edwin Grundy, Chemist and Druggist, Sneinton, Nottingham. Aged 69 years.

On the 27th of June, Mr. Thomas D. Walker, Pharmaceutical Chemist, Dresden, Staffordshire. Aged 66 years. Mr. Walker had been a Member of the Pharmaceutical Society since 1853.

On the 28th of June, Mr. John Henry Soole, Chemist and Druggist, Compton Street, London. Aged 61 years.

On the 29th of June, Mr. Charles Brailey, Pharmaceutical Chemist, Heavitree, near Exeter. Mr. Brailey became a Member of the Pharmaceutical Society in 1842.

On the 30th of June, Mr. William Arthur Brearey, Pharmaceutical Chemist, Douglas, Isle of Man. Aged 70 years. Mr. Brearey had been a Member of the Pharmaceutical Society since 1879.

On the 1st of July, Mr. Stephen Hipkins, Chemist and Druggist, Prince's End, Staffordshire. Aged 70 years.

On the 5th of July, Mr. Richard Arton, Chemist and Druggist, Preston Street, Hulme, Manchester. Aged 82 years.

On the 6th of July, Mr. Bryan Barnes, Chemist and Druggist, St. Peter's Street, Derby. Aged 57 years.

On the 9th of July, Mr. Samuel Watson, Chemist and Druggist, High Street, Hounslow. Aged 39 years. Mr. Watson had been connected with the Pharmacentical Society since 1870.

On the 10th of July, Mr. Frederic Abraham Cole, Chemist and Druggist, St. Botolph's Street, Colchester. Aged 50 years. Mr. Cole had been a Member of the Pharmaceutical Society since 1869.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Unfair Competition.

Sir,—Mr. Humphrey in his last letter seems to think that if grocers have to be examined before they are allowed to retail drugs, they will be more likely to undersell and adulterate than they are now; but why examinations should have such a demoralizing effect upon them I cannot imagine.

My contention is that if grocers were obliged to undergo an examination before they were allowed to retail drugs, they would at once abandon the idea of embarking in the business, and thus would come about the removal of our objectionable competitors, a consummation most devoutly to be wished.

Again Mr. Humphrey says the public and their representatives are not likely to grant any such monopoly.

What monopoly?

Chemists have all the monopoly of examinations and do not want it; we would like the grocers to share our monopoly. As for its being absurd that we should wish so, I take it it would be absurd if we did not wish so.

I will only add that I am sorry Mr. Humphrey does not think the diplomas of the Pharmaceutical Society are adequate to prove that the gentlemen possessing them are fit and proper persons to carry on, in its scientific and moral integrity, the responsible business of a chemist and druggist.

157, *Borough High Street.* Frank Tebbutt.

H. Skinner.—Your letter and accompanying cutting have been handed to the Registrar.

F. C. F.—The formula of butyric acid is $HC_4H_7O_2$. The acid can be formed by allowing a solution of grape sugar to ferment in contact with decayed cheese.

Ignoramus.—*Ægopodium Podagraria.*

F. C.—Yes. See Bentley and Trimen's 'Medicinal Plants.'

A. O. C.—Probably a solution of nitro-glycerine is meant, but we know of no authoritative formula for such a liquor.

Zero.—Not as the widow, but only if she happen to be an executrix or trustee.

C. T. Davis.—We are unable to comply with your request.

T. Rheeder.—*Erinus alpinus.*

Quæro.—The effect could be produced by the use of potassium or sodium.

M. D. X.—The material sent is insufficient to allow of the plant being identified.

W.—(1) *Rumex obtusifolius*, var. *Friesii.* (2) *Rumex crispus.* (3) *Senecio vulgaris.* (4) *Trifolium repens.* (5) *Centaurea nigra.*

Chemicus.—We are unable to give the information asked for.

Communications, Letters, etc., have been received from Messrs. Creteur, Flückiger, Wilkinson, J. R. Young, Francis.

FLETCHERS'
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Opinions of Pharmacists.

From **Mr. GEORGE BROWN,**
Pharmaceutical Chemist.

In reply to your inquiry, I may state that I have found your Liquors keep well and free from deposit. I have been in the habit of using *Liq. Ferri Phosph.*, *Liq. Ferri Iodid.*, *Liq. Calcis Hypophosh.*, and *Liq. Ferri Phosph. Co.*, and find them produce elegant preparations.

Yours truly
George Brown

Sandown.

From **Mr. T. WATERHOUSE,**
Dispensing Chemist.

I have thoroughly tested your Concentrated Liquors, and I cannot speak too highly of them. I now use them, to the exclusion of all other similar preparations, in my dispensary. They save time, are very reliable, and come as a boon to dispensing chemists. I get them regularly through my drug house

Truly yours,
T. Waterhouse

Uxbridge.

From **Messrs. HOPWOOD & SON,**
Pharmaceutical Chemists.

We have much pleasure in bearing testimony to the very satisfactory results which we have always obtained from the use of your valuable preparations. We have now used the Concentrated Liquors for some considerable time, and have never once heard any complaint arising from want of uniformity in the result obtained, a state of affairs scarcely possible under the old method of keeping the ready-made Syrups.

Yours faithfully
Hopwood & Son

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From **Messrs. SYMES & CO.,**
Pharmaceutical Chemists.

We have carefully examined the samples of Concentrated Liquors, and have prepared the various Syrups therefrom. The Liquors are of full strength; the Syrups excellent.

Faithfully yours
Symes & Co.

Liverpool.

From **Mr. S. LAWRENCE,**
Dispensing Chemist.

During the past year I have thoroughly tested most of your Concentrated Liquors, and have derived much satisfaction from their use, now finding my Syrups uniform in strength, appearance, and flavour; and as it is of the utmost importance that these qualities should predominate in all pharmaceutical preparations, I can confidently recommend your Liquors to all dispensing chemists.

Yours faithfully
Samuel Lawrence

Oban.

From **Mr. A. E. REMINGTON,**
Dispensing Chemist.

I have had the pleasure of trying your *Liq. Ferri Iodid.*, *Liq. Ferri Phosph.*, *Liq. Eastoni.*, *Liq. Tolut.*, and one or two others, and finding that to once use them creates a want, I should like to stock them on the most favourable terms to myself and introduce them to brother druggists. I may say that, on first reading your advertisements, I was sceptical as to the medicinal value of such Concentrated Liquors, but am happy to state that, having used them now for over twelve months, I am so convinced of their stability and reliability that I intend to make all my Syrups for the future with your Liquors.

Faithfully yours
A. E. Remington

Wellington, New Zealand.

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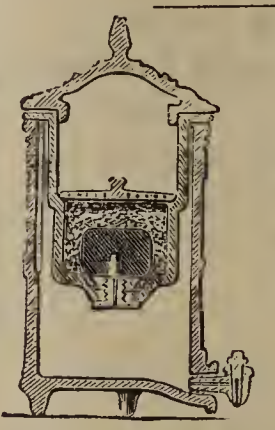

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At the Examinations held in London last month, **2 Major** Candidates from this School presented themselves. **Both** passed.

Mr. GIBBS. | Mr. WEBBER.

10 Minor Candidates from this School presented themselves, of whom the following **7** passed:—

Mr. FOOT. | Mr. LANGFORD
„ GARDNER. | „ MARSH
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ESTABLISHED 1ST OCTOBER, 1868.

THE TWENTIETH SESSION, 1887-8,

Will commence on the 15th September.

A class of Students not going up in July will meet on the 18th August for October; there will be room for two or three more to join them.

For Fees, &c., apply to W. BAXTER, Secretary.

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PASS LIST FOR APRIL.

Major - - -	Mr. H. WYATT, Bootle.
Minor - - -	„ E. JONES, Portmadoc.
	„ B. PHILLIPS, St. Clears.
	„ A. STEPHEN, Liverpool.
Preliminary -	5 sent in, and all passed.

JUNE.

Major - - -	Mr. W. H. CLUBB. Liverpool.
	„ J. W. LANG, Southport.
Minor - - -	„ C. E. HANSLOW, Woodford.
Apothecaries' Hall	„ J. W. WHITELY, Gainsborough.

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Fellow of the Royal Botanic Society

The next Session will commence on Monday, September 5th.

Students who are commencing their studies will fin this a valuable opportunity of obtaining a thorough Pharmaceutical Education, and efficiently preparing themselves for the requirements of the Board of Examiners.

As an example of the success attending this College reference can be made to the results of the Examinations, published in the advertisements of this School in the *Pharmaceutical Journal*.

Students desirous of entering should send in ther names as early as possible, as the vacancies are fast filling.

Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

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JULY, 1887.

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Certificate of Merit	Mr. H. ROBERTS.
„ „	Mr. T. PARRY.
„ „	Mr. S. SHILLCOCK.
„ „	Mr. J. B. FORSTER.

JUNIOR CHEMISTRY.

Bronze Medal ...	Mr. T. A. WHITE.
Certificate	Mr. W. H. P. KENT.
„	Mr. T. M. COOK.
„	Mr. G. J. KIRKUP.
„	Mr. E. A. ROWBOTTOM.

MATERIA MEDICA.

Bronze Medal ...	Mr. J. W. T. MORRISON.
Certificate of Merit	Mr. T. W. ROBSON.
„ „	Mr. G. JEFFRIES.
„ „	Mr. H. AYRE.
„ „	Mr. R. C. BURTON.
„ „	Mr. J. R. DAVISON.
„ „	C. E. WILKINSON.

BOTANY.

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St. Thomas's Hospital Medical School,

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The WINTER SESSION of 1887-88 will commence on OCTOBER 1, when an Introductory Address will be delivered by R. W. REID, Esq., F.R.C.S., at 3 p.m.

Two entrance science scholarships of 125 guineas and £30 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics, with either botany or zoology, at the option of Candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

All Hospital appointments are open to students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several medals.

The fees may be paid in one sum or by instalments. Entries may be made to lectures or to Hospital practice, and special arrangements are made for students entering in their second or subsequent years, also for dental students and for qualified practitioners.

Several medical practitioners and private families residing in the neighbourhood receive students for residence and supervision, and a register of approved lodgings is kept in the secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.
R. W. REID, Vice-Dean.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. **35** Pupils passed the last Examinations.

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INDIAN MEDICAL SERVICE.

India Office, 9th July, 1887.

TWENTY-THREE appointments will be competed for on the 8th August next, instead of 18, as previously advertised. (See newspapers of 20th June and following days.)

(Signed) ALLEN JOHNSON, Lieutenant-General,
Military Secretary.

VACANCY for Dental Pupil. In or out-door. Reference to former pupils. Considerable opportunity for experience in Dental Mechanics from large turn-out for the profession and private practice. Mr. WHITEHOUSE, L.D.S., 8, The Sanctuary, S.W. (opposite Westminster Hospital).

ENGAGEMENTS WANTED.

Advertisements under this heading are charged as follows—Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

AS LOCUM TENENS or permanency. Age 36. Married. Experienced. Good references. Disengaged August 6th. C. W. B., 77, Branch St., Burnley.

ENGAGEMENT or engagements wanted, from August 27th till September 31st. West-end experience. C. R., Messrs. Stickland and Rowe, 23, Cromwell Pl., S.W.

WANTED to apprentice a youth aged 14½ to country Chemist, where he would acquire thorough practical knowledge in every department. Terms and full particulars. HENRY, 77, Macfarlane Rd., Shepherd's Bush, London.

AS MANAGER or ASSISTANT. Out-door. Age 24. 10 years' experience. Highest references. City preferred. H. DAWES, 5, Alcester Villas, Buckland Rd., Leyton.

DISPENSER or JUNIOR, in London. Part-time. COCKRILL, Drury House, Gorleston.

WANTED to place a well educated youth as in-door APPRENTICE. Has passed Preliminary Exam. Moderate premium. Full particulars. Address, K. G., care of Mr. Hawthorn, Uppingham.

LOCUM TENENS. Ætat 30. Disengaged. Minor ALPHA, 83, Lady Margaret Rd., N.W.

ENGAGEMENTS WANTED.

AS ASSISTANT. With a view to succession preferred. London or suburbs. Age 25. 9 years' experience. Good references. MAJOR, 47, Grange Pk., Ealing, W.

CHEMIST or Surgeon. Out-door. Age 28. Dentist. Married; no children. CHEM., 13, Burdett St., London, E.

AS ASSISTANT, in good class business, chiefly for Dispensing. Ætat 28. Height 5ft. 8in. Qualified. Disengaged. MINOR, 28, Salisbury Rd., West Kilburn, N.W.

LOCUM TENENS. Minor. Age 25. Excellent references. Apply, stating terms, to P. GRAY, 96, Berkeley Rd., Bishopston, Bristol.

MANAGER of Branch, or Out-door ASSISTANT. 25. Married. Good Prescriber and Teeth Extractor. BOWEN, 18, George St., Brighton.

OUT-DOOR or to MANAGE. Age 34. Married. 18 years' London and provincial experience. Good Prescriber. Neat and accurate Dispenser. Extract Teeth. Good references. E. C., 85, Beckett St., Leeds.

TEMPORARY or MANAGER. Age 37. Prescribe. Extract Teeth. W. R. A., 33, Liverpool Rd., N.

ASSISTANT, 23, experienced, abstainer. CHEMICUS, Hampden House, Tottenham Rd., Kingston, Portsmouth.

JUNIOR. Age 20. Height 5ft. 9in. 6 years' experience. Good references. A.B., Mr. Shaw, Chemist, Oakengates, Salop.

JUNIOR, age 21½, experienced. Prescribe and Extract Teeth. References. West preferred. WM. MATTHEWS, 44, Mary-le-port St., Bristol.

AS JUNIOR. Aged 19½. 3½ years' experience. Good counterman. Quick Dispenser. INDUSTRY, 131, Hopton Rd., Coventry Park, Streatham, S.W.

AS ASSISTANT. Good experience. Can Extract Teeth. Age 24. Height 5ft. 6in. J. W. D., 237, Kennington Rd.

AS IMPROVER. Registered Pharmaceutical student, age 20, desires engagement. Salary, secondary consideration. 18 months' experience in Pharmacy and Dispensing. LANKFORD, Westbury-on-Trym, Bristol.

TEMPORARY for month of August. Good references. F. G., 2, Falmouth Rd., Southwark.

FOR August. Medical and Dental STUDENT (Minor, Hall, &c.). Would manage Dental practice, Dispense, or manage entirely. Highest references. Full particulars from MEDICUS, Hodgkinson, Stead, Clarke, 198, Upper Whitecross St.

AS JUNIOR, about the middle of August. Age 20. Height 5ft. 7in. 5 years' experience. BROADLEY, 11, Eastfield Rd., Louth.

ASSISTANT. Age 23. Minor. Disengaged August 4th. Knowledge of Photography. 8 years' experience. ALPHA, 19, Laura St., Sunderland.

AS MANAGER or out-door ASSISTANT. Age 31. 16 years' experience. 5 as Manager. E. W., 26, Sydenham St., Whitstable.

IMMEDIATELY.—MANAGER or TEMPORARY. Seaside preferred. Hall. Age 24. Height 6ft. 8 years' high class Dispensing experience. Just completed 2½ years' West-End engagement. UNDERGRADUATE, American Exchange, 449, Strand, W.

AS JUNIOR. 3 years' good experience. Age 19. Height 6ft. Passed Prelim. Disengaged August 10. Reference from present employer. CHEMIST, Arthur St., Newton-Stewart, N.B.

TEMPORARY, or Branch MANAGER. Good Prescriber. Qualified. Town or country. Terms moderate. H., 73, Shakespere Rd., Stoke Newington.

ENGAGEMENTS WANTED.

OUT of the house, where time would be allowed for study. Good references. Small salary. E. PORTER, 43, Tennison Street, York Rd., Lambeth.

AS JUNIOR. 5 years' experience. Age 19. W. R. THOMPSON, P.O., Walmgate, York.

IMMEDIATELY. Out-door. Age 28. Experienced. MINOR, 6, St. Stephens Ter., Clapham Rd.

AS DISPENSER to SURGEON, in London. 7 years' experience. Age 22. J., 8, Upper Well St., Coventry.

WANTED to apprentice a well educated youth, aged 15½, to a chemist, where he will acquire a good knowledge of the trade. A small premium will be paid. Address, MATER, 88, Evelyn St., Deptford, S.E.

TEMPORARY. Good Prescriber. Minor. Hospital experience. A. P. S., 55, Pentonville Rd., N.

TEMPORARY Engagement for a few weeks, or Permanency, with part time from Sept. 6 to October Examination. Disengaged Aug. 8. A. E. H., 195, High Rd., Kilburn, N.W.

DISENGAGED. Minor. Ætat 25. Town and Country experience. FIDELIS, Headon House, Sutton Coldfield.

AS MANAGER, ASSISTANT, or DISPENSER to a Medical Man. Age 29. Height, 5ft. 10in. Good appearance and experience. Town or Country. Good references. F. HIGGS, care of Higgs Bros, Bartholomew Street, Newbury.

GOOD DISPENSER. 25. Services for board and lodging with time for reading. W. R., 41, Duke Street, Manchester Square.

AS MANAGER. 9 years' good reference. GRADUES, 10, Lodge Avenue, Mortlake.

AS MANAGER or SENIOR in first-class business, with view to purchase. J. H., 14, Elms Rd., Clapham.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

LOCUM TENENS wanted for three weeks, commencing August 15th. Must be qualified. Apply, stating terms, references, &c., E. A. ANDREWS, North West London Hospital, Kentish Town Rd., N.W. Dinner and tea provided.

IMMEDIATELY. — A competent ASSISTANT, not under 22, in a light Retail and Dispensing business. State age, height, salary, and last references, with carte (to be returned), to W. E. WHITE, Pharmaceutical Chemist, Cuckfield, Sussex.

A JUNIOR ASSISTANT. Must be of gentlemanly appearance, and an accurate Dispenser. Apply to JAMES CHIPP, Mildmay Pk., N.

SENIOR ASSISTANT. A thoroughly competent man to take entire charge of a large Dispensing business in the absence of the proprietor. Must be qualified, quick, and a thoroughly sharp business man, between 27 and 30. Apply, W. THOMAS, 103, Talbot Rd., Bayswater, W.

AN English ASSISTANT. Apply to LONDON DISPENSARY, Biarritz, France.

BOURNEMOUTH.—Competent ASSISTANT required (Minor) for 3 months. Unexceptionable references required. State full particulars, and enclose carte, to J. D. HAZARD, M.P.S., Bournemouth.

ASSISTANTS WANTED.

JUNIOR Assistant, to act as Clerk. A qualified man who has had experience in Book-keeping required. Apply, by letter, to Allen, Hanburys & Co., 7, Vere St., London, W.

AN Assistant. West-end. Out-door. Hours 9 to 7. Must have passed Prelim. Apply, by letter only, stating salary, &c., H., 62, Poet's Rd., Highbury, N.

BY 8th of August.—As second Assistant. Age about 23. Middle height. Good appearance. Competency as well as qualification required. Salary £45. Apply (personally), morning 10 to 12, evening 6 to 8, White & Son, 19, Park Ter., Regent's Park.

APPRENTICE wanted. Must be well educated and thoroughly respectable. Apply, by letter, W. Gowen Cross, Pharm. Chemist, Shrewsbury.

ASSISTANT (in-door), to take almost entire management of suburban light Retail. Qualified. Not under 25. State references, salary, age, height, enclosing carte, if from the country, to N. Allsworth, 290, Clapham Rd., S.W.

AN Assistant, not less than 22, minor qualification, accustomed to a good class Dispensing and Retail. Apply, stating height and salary required, to E. Davenport, M.P.S., St. Albans.

OUT-DOOR Assistant wanted during August and September, for West-end. Particulars as to salary, &c., to A. B., care of Messrs. Sanger & Sons, 489, Oxford St., W.

TEMPORARY, for a few days, to take charge of Retail, commencing July 30. Must be energetic, and thoroughly reliable. Apply personally, 75, Frampton Park Rd., Hackney, E.

TWO Juniors, for cash business. About 22. Indoors. (One for branch). Must be well up in Dispensing and counter. Also one for making B.P. preparations and stock. Personal application, or if by letter, send photo with usual particulars to J. H. Lewis, 22, Gt. Portland St., W.

JUNIOR required, accustomed to a good-class provincial or town business, and who has done some dispensing. Send full particulars and salary required to G., 36, Camden Square.

AT once, a pushing young man with some Retail and Dispensing experience. State age, experience, reference and salary (out-door). Carter, Chemist, 4, Melville Ter., Woolwich.

MOTTERSHEAD & Co., Pharmaceutical Chemists, 7, Exchange St., Manchester, require a qualified Dispenser, out-door. State age, references and salary required. Applications not replied to in 3 days to be considered declined.

IMMEDIATELY.—A competent, steady Assistant, accustomed to a Mixed business. Welsh necessary. Apply, stating age and salary required, with references, to H. E. White, Chemist, Mountain Ash.

A COMPETENT Assistant, of good address and obliging business habits. Not under 23 years of age. Must be an accurate Dispenser and good Counterman. State age, height, and salary required, with references, enclosing carte (to be returned), to W. J. Barnes, 54, Biggin St., Dover.

ASSISTANT for a London Branch. Excellent opportunity for a Junior requiring time for study, or one desiring a permanent engagement. Apply, with references, salary required, when disengaged, and carte to Fides, Messrs. Meggeson & Co., Miles Lane, Upper Thames St., E.C.

IMMEDIATELY.—A qualified Assistant. Not under 24 years of age. Apply to T. Tomlinson, 2, Lower Seymour St., Portman Sq., W.

ASSISTANTS WANTED.

AN Assistant with the Minor qualification. Must have good references. Apply to J. Robins, Woodford, Essex.

A THOROUGHLY competent Assistant, indoor, for a good class Retail and Dispensing business. One with London experience preferred. Must have passed Minor. Apply, stating age, height, salary required, and references, to Hy. Monkhouse, All Saints, Derby.

AN Assistant, about 23. Apply personally (or letter with full particulars). Thos. McCrindle, High Rd., Tottenham, N.

EARLY in August.—A good temporary Junior Assistant, for about 6 weeks. One used to postal duties preferred. Also an Apprentice. No premium. Apply with full particulars, to Williams, Chemist, West Hill, S.W.

JUNIOR Invoice Clerk for wholesale, wanted at once. Neat and rapid writer indispensable. Address with full particulars, of age, salary, and present and past engagements, to Invoice, care of Lee & Nightingale, Advertising Agents, Liverpool.

TO Students.—An Assistant, who thoroughly understands the Chemist's business, is required to give a portion of his time in return for board and lodging without salary. Duties very light, and plenty of time for reading and lectures. Apply (personally preferred) to Dr. Chandler, 22, Battersea Rise, Clapham Common (near Clapham Junction), S.W.

ABOUT middle of August. Manager for Branch in a country town. Apply, with full particulars, as to salary, experience, references, &c., to D. Vaughan, Chemist, Oswestry.

IMMEDIATELY.—Assistant for provincial town. Must have been accustomed to good class business. Would be required 1 or 2 days a week to introduce proprietaries to private families, &c. Particulars of experience, age, creed, with photo and salary, required, by letter, to Mids, Messrs. Sangers, 489, Oxford Street, London, W.

AN Assistant for first-class Retail and Dispensing Business. Minor qualification preferred. Aged about 24. Apply with full particulars as to salary, experience, &c., to Hopwood & Son, Hill St., Richmond, Surrey.

A TRUSTWORTHY Assistant (in-door) to take charge of a branch shop; also a Junior or Improver, about 20. Address, Essex, Messrs. Hodgkinson, Treacher & Clarke, 198, Upper Whitecross St., London, E.C.

ASSISTANT, able to Dispense and Prescribe, and speak Welsh Also pupil required for 3 years; enclosing carte and full particulars. Apply, John Edwards, Chemist, Conway.

AN Assistant, about 21 years of age. Accurate and neat Dispenser, and accustomed to an ordinary country business. In-doors. One only kept. Send usual and full particulars, salary, &c., to J. Tilson, Long Sutton, Lincolnshire.

AUGUST 2nd.—A competent Assistant (single) to manage small branch in the country, under supervision of principal, with postal duties, which may be soon acquired. Salary, commission, and furnished apartments, with attendance. Unexceptionable references required. Send full particulars, with photo (if possible), to Z., care of Baiss Bros., Jewry St., Aldgate, E.C.

JUNIOR Assistant, not under 20, who has been used to a good country trade. Must be well recommended by former employer, and whose character will bear investigation. Enclose carte (to be returned), with full particulars, to D. Prosser, Sheerness.

ASSISTANTS WANTED.

JUNIOR Assistant. Out-door. Apply personally, if possible, at 143, Hackney Rd.

BRIGHTON (West).—A competent Assistant for a good class Dispensing business where 2 Assistants are employed. He must have passed Minor examination, be a reliable Dispenser, and of good address. Personal application or full particulars (with carte), and stating salary required, to J. Padwick, 5, Preston St., Brighton.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

CHEMIST'S old-established Business for sale, owing to failing eyesight of proprietor. Stock reduced. Incoming £80. Good Prescribing and Teeth Extracting, with Dentistry. Walker, Chemist, Pudsey, Leeds.

LONDON suburb.—A light Retail and Dispensing Business, well situated in a large and populous good class neighbourhood, virtually unopposed, and capable of being considerably increased. £600 capital will be required to purchase. Address, M. R., care of Mr. Wates, 112, High St., Sydenham, S.E.

LONDON, S.W.—Dentist, Chemist, and Botanic Business. Old established. Main road. Rent £55, on lease. Well stocked, &c. Returns £400. Instruction given in Dentistry if required. Retiring from business. Price, including Dental Laboratory, tools, &c., cash £350. Open to offer. Address, Walker & Troke, 82, City Rd., London.

A GENUINE Dispensing and Family Retail Business, very pleasantly situated in Canonbury, Islington. Been in present proprietor's hands 10 years. Returns may be doubled by constant personal attendance. A personal interview best. Apply for particulars to T., care of Messrs. Hearon, Squire & Co., 5, Coleman St., City, E.C.

UPPER St., Islington. Good Retail Business. Must be sold, through illness. In present hands 14 years. Returns nearly £500. Capable of being largely increased by an energetic man. Rent £61. 12 years' lease. Good stock. Trial allowed. Price £400, or reasonable offer. M. T. F., 145, Upper St., N.

AN old-established Dispensing and Family Business situate at the West-End for sale by order of Executors. Good opening for a Dentist. For particulars, apply to Charles Barfield, Esq., Solicitor, 72, Finsbury Pavement, E.C.

IN a populous suburb of London. A first-class Dispensing and Prescribing Business. Long lease. Low rent. Large returns and profits. To be disposed of through ill-health. Price £1000. W. E., 30, Shepherd's Bush Green, Hammersmith, W.

WORCESTERSHIRE.—Market and manufacturing town. Good class Retail and Prescribing Business, returning £665. Same hands 8 years. Now leaving the Retail. Well-fitted and stocked. Net profit £250. Convenient 8-roomed house. Greenhouse, long garden. Rent only £30. Rare opportunity to anyone with £520. Messrs. Berdoe, 30, Jewry St., Aldgate, City.

A GENUINE old-established Business in a good country town of West Suffolk. Excellent position and frontage. Shop nicely fitted and well stocked. Good warehouse and small garden. Rent £45. Price £850. Satisfactory reasons for disposal. Full investigation allowed. Not offered before. For further particulars. address in the first instance, Chemist, care of T. Hunt, Esq., Church St., Stratford-on-Avon.

BUSINESSES FOR DISPOSAL.

AN old-established Business, which has been in the same hands many years, doing a good family trade, to be disposed of, the owner going abroad. Shop well stocked and in a first class position. Rent £40. Price £950; also a branch shop. Particulars from J. Robins, Woodford, Essex.

£2000.—A GENUINE light Family Retail, Dispensing and Prescribing Business, in a beautiful locality and fox hunting centre in Yorkshire. The above price will be taken for the freehold house and shop, with large warehouses and laboratory, including the stock and fixtures. Half the amount can remain on mortgage. Full particulars from Pharmacist, care of Raimes & Co., York. Satisfactory references given and required.

£65 WILL purchase a neglected Business in main rd., S.E. Retail and Prescribing trade, and returning £4 weekly at full prices, patents not cut. Same hands 18 years. Good house, small garden. Splendid chance for an energetic young man. M. P. S., 45, St. James' Grove, Peckham, S.E.

NORTH-West Coast. Favourable health resort. Good class Retail and Dispensing. Splendidly fitted shop in a first rate position. Capital opening for an energetic business man accustomed to a good class business. For full particulars, apply to M. P. S., care of Messrs. Evans & Sons, Liverpool.

BUSINESS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

A SOUND light Retail, Dispensing and Prescribing Business, requiring the investment of £400 to £500. Suburban, Cheshire, or Manchester district preferred. Address, Chemicus, care of Mr. Tomlinson, 5, Walton's Buildings, New Brown St., Manchester.

CHEMIST about to fit new shop requires good second-hand Fittings, or would take entire stock and fittings of shop for removal, if a bargain. Address, W. J. 3, Market Pl., Grays, Essex.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

Cheshire.—First-class Retail and Dispensing. Good profits. Returns £1000. Price £650, or valuation. Large shop, handsomely fitted. Good house.

Kent.—Old-established, first-class Retail and Dispensing Business. Average returns for three years £1000, at full prices. Price £900. A sound investment.

Surrey.—Retail and Dispensing. Well situated. Shop handsomely fitted. Returns £800. Price £600.

London, N.—Ready-money Retail and Prescribing. Excellent profits. Returns £700. Price £700.

London, N.—Retail and Prescribing. Returns £400. Has done £600, and would again. Price £400.

TO BE LET.

8-ROOMED House and Shop, well situated for a Chemist and Druggist's, in a capital position. Rent £40. For further particulars apply to D. I., 49, Springfield Rd., Walthamstow.

F. J. BRETT,
VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.
Probate and Fire Insurance valuations.

HULL (Suburb).—Good class Retail and DISPENSING, in excellent position. House good. Returns £650. Price about one year's returns, value of stock and fixtures.

LIVERPOOL (near).—Dispensing and light RETAIL. Very few patents. Good prices. Returns £700, and can by personal attention soon be £1000. Illness cause of sale. Price £650.

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SHEFFIELD.—Retail and PRESCRIBING, and very fair Dispensing. Returns £450. Price £350.

WALES, S.—Death vacancy. Returns average £1200. Price £800, or valuation.

YORKS.—Good class country RETAIL, with Agricultural and Mineral Waters. Returns £1500. Price £700, or valuation.

CHESHIRE.—Old-established Retail and DISPENSING. Returns £1100. Price £600, or valuation. Ill-health cause of sale.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

Messrs. BERDOE & CO.
Valuers, Transfer Agents & Auctioneers,
30, JEWRY STREET, ALDGATE, CITY.
Established 1870.

HOME COUNTY.—Market town. Same hands 16 years. Retail and DISPENSING. Returns £900. Net profit £400 guaranteed. Price £750.

BANKS OF THAMES (20 miles out).—Retail and PRESCRIBING. Returns £700; neglected. Price £450.

SOUTH COAST.—Retail and PRESCRIBING. Returns £550. Large house. Under assistant. Price £400.

NORFOLK COAST.—Retail and Prescribing TRADE, in excellent position. Returns £600. Price £475.

HANTS.—Large town. Same hands 14 years. Making £250 net profit. Price £600.

KENT COAST.—Retail and PRESCRIBING. Good house; garden. Rent £35. Returns £500. Price £425.

MIDDLESEX (few miles out). — Well fitted RETAIL. Making £200 net profit. Only £180.

LONDON AND SUBURBS.—Several from £100 to £1000.

Important to Chemists Fitting-up, &c.

FOR SALE.—Fifteen dozen gold labelled Shop Rounds, Jars, and Syrup Bottles. 12-ft. range mahogany Drawers, with bevelled plate-glass labels, with lockers under, £10 10s. Ditto in French-polished pine £9. Glass Case and desk, 50s. 12-ft. range gold labelled pine Drawers, £6 12s. Six 4-gallon pear shape Carboys, 10s. each. Wall Case, second-hand, about 6ft. long, £6. Twenty-four 4-lb. best pink Jars, gold labelled (new), 5s. each. Twenty-four 3-lb. blue Ointment Jars, gold labelled, 2s. each. 8-ft. mahogany Wall Case, new, £15. Plans and estimates free. Shops fitted and alterations undertaken in any part of the country.—R. TOMLINSON & SONS, Bond Street, Constitution Hill, Birmingham.

For Terms for Advertisements see page iii.

CHEMISTS' TRANSFERS.
32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer:—

1. LONDON, N.W.—Cash BUSINESS, Retail, Dispensing and Prescribing. Returns £835, with large profits. Good house, well situated. Open to the fullest investigation. Price about £500.
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3. MIDLANDS.—Attractive locality. First-class Retail and Dispensing BUSINESS. Returns about £850. Good house; moderate rental. Vendor having special reasons for an immediate sale will deal liberally with a prompt purchaser.
4. SUFFOLK.—Unopposed country BUSINESS. Returns at present about £300 yearly. Good opening for Mixed trade. Good house. Rent low. About £250 required.
5. ESSEX.—Good town. Retail and DISPENSING, with some Prescribing. Returns last year nearly £600. Large 8-roomed house. Rent £55. Good garden and warehouse. Price £430.

WANTED.

WANTED.—Partnerships or first-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly. Cash ready.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.
32, Ludgate Hill, E.C.

BUSINESS NOTICE.

A. WALES BERRY begs to give notice that the business of a Chemist and Druggist, lately carried on by him under the style of "SHEPHERD & Co.," at 139, High Street, Guildford, will in future be carried on by him at the same address in his own name, Mr. G. P. Shepherd having ceased to have any interest in the said business from 18th December, 1884.

INGRAM & ROYLE

52, FARRINGDON STREET, E.C.

AND AT

LIVERPOOL AND BRISTOL.

SOLE ENGLISH BRANCH OF THE

COMPAGNIE FERMIÈRE DE L'ÉTABLISSEMENT THERMAL DE

(STATE **VICHY** SPRINGS.)

CELESTINS.—A celebrated remedy for Diseases of the Kidneys, Gravel, Gout, Rheumatism, Diabetes, &c.

HAUTERIVE.—Strongly impregnated with natural Carbonic Acid, which renders it very fit for EXPORT. An excellent TABLE WATER. Invaluable for Dyspepsia, Indigestion, &c.

GRAND-GRILLE.—For Diseases of the Liver and Biliary Organs, &c.

HÔPITAL.—For Stomach Complaints, Difficult Digestion, Want of Appetite, &c.

TRADE PRICE ... ... { 31/- per Case of 50 Bottles, / 27/- „ 50 ½-Bottles, } CARRIAGE PAID.

5 per Cent. Discount for Cash, or Quarterly Account Net.

HUNGARIAN NATURAL MINERAL WATER

Apenta

HIGHEST AWARD

AT THE

INTERNATIONAL MEDICAL EXHIBITION, LONDON, 1881.

Sample Bottle may be had from the Company's Office, at 38, SNOW HILL, LONDON, E.C.

TRADE PRICE ... ... { 28/- per Case of 25 Bottles, / 46/- „ 50 ½-Bottles, } CARRIAGE PAID

5 per Cent. Discount for Cash, or Quarterly Account Net.

WHOLESALE AGENTS:

INGRAM & ROYLE

52, Farringdon Street, E.C., and at Liverpool and Bristol.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

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AND
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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

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The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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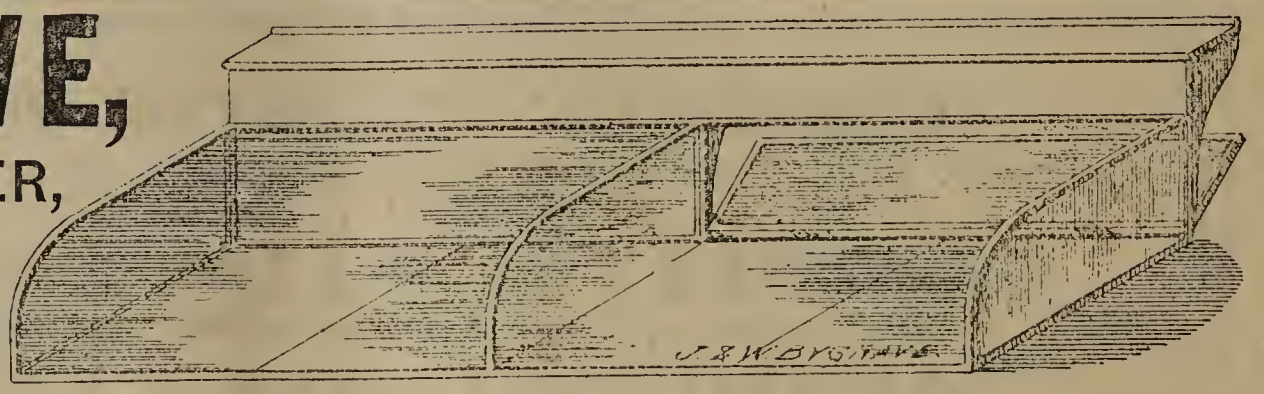

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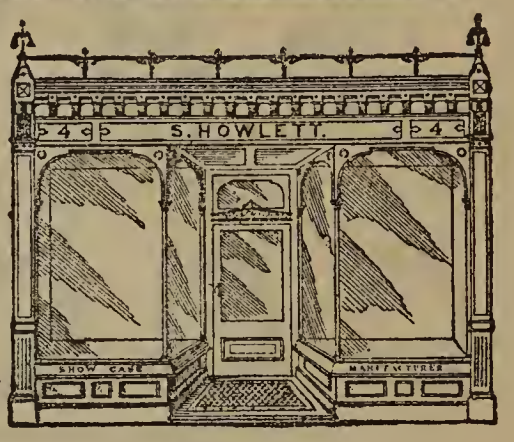

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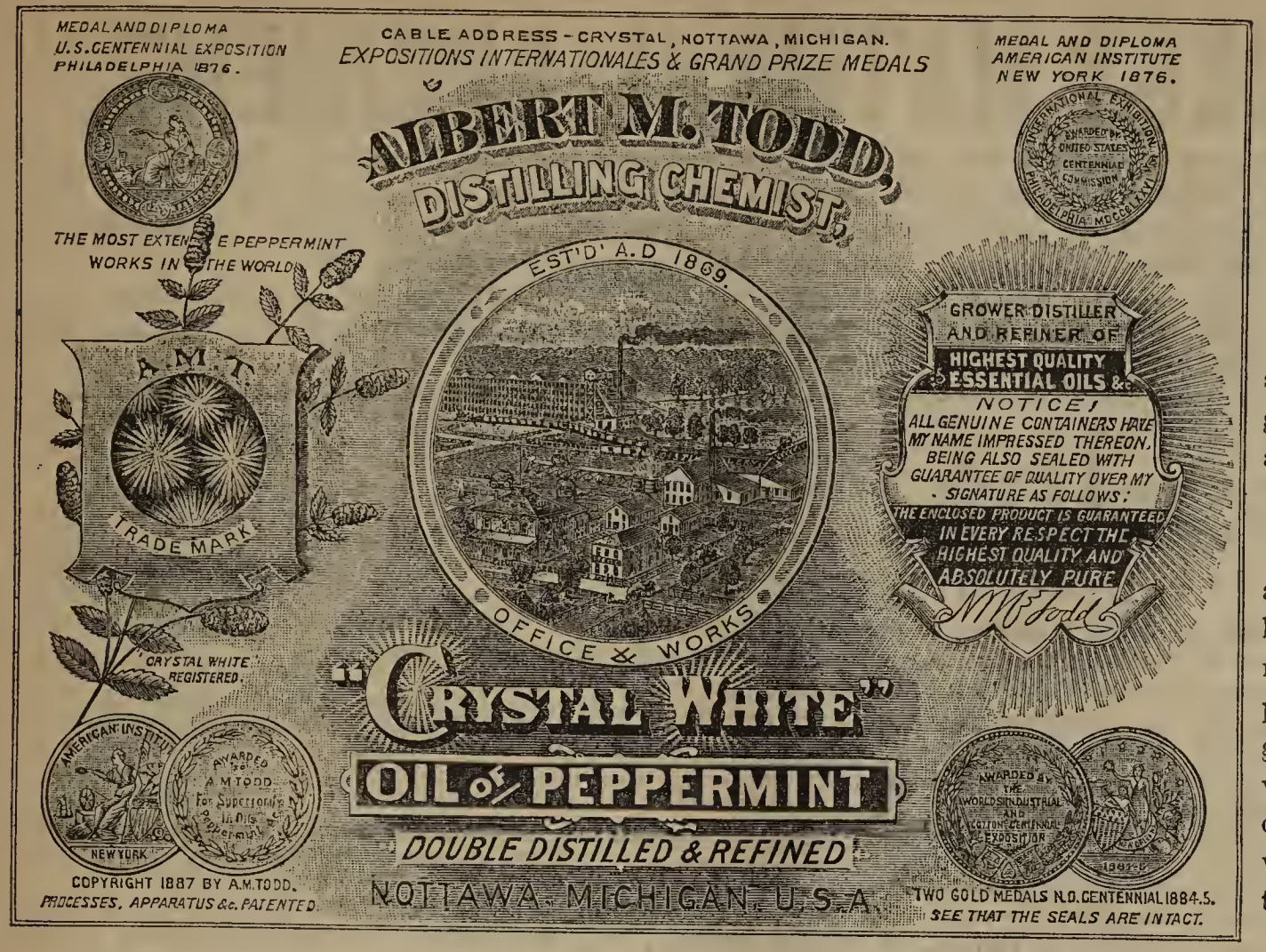

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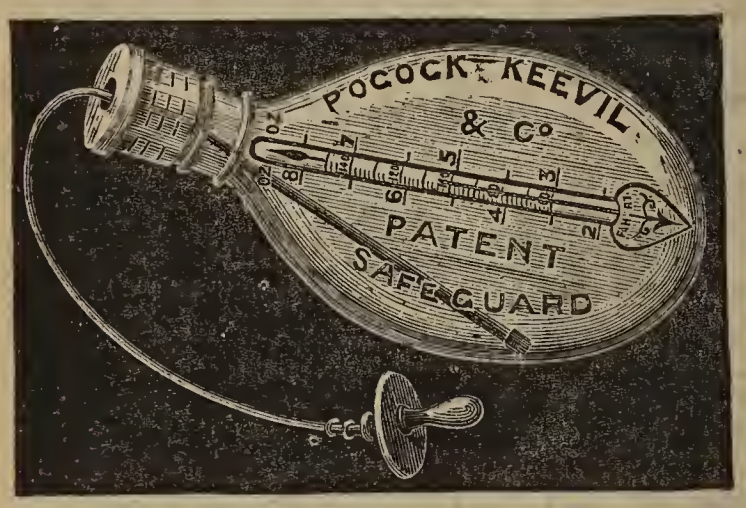

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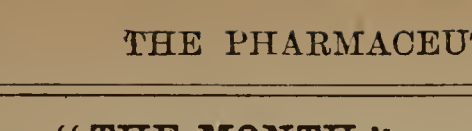
SPECIAL PRICES ON APPLICATION.

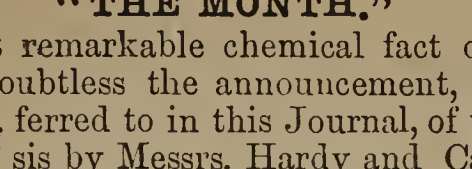
"THE MONTH."

Synthesis of Pilocarpine.

The most remarkable chemical fact of the past month is doubtless the announcement, already referred to in this Journal, of the synthesis by Messrs. Hardy and Calmels of a second natural alkaloid, pilocarpine (*Compt. Rend.*, July 4, p. 68). The starting point was "β-pyridino α-lactic acid," a derivative of pyridine which had previously been recognized among the decomposition products of pilocarpine and described by the authors (*Compt. Rend.*, cii., 1563). The first stage was the conversion of this compound into pilocarpidine. To effect this it was treated with hydrobromic acid and gold chloride, by which the lactic acid was reduced to propionic acid, and a bromo-auric compound of β-pyridino α-propionic acid obtained. This was decomposed with sulphuretted hydrogen, and the syrupy acid set free was heated in a sealed tube with a solution of trymethylamine. The contents of the tube were afterwards brought to dryness, and the residue treated with aqueous solution of potassium carbonate, when oily drops separated that proved to consist of pilocarpidine. The conversion of pilocarpidine into pilocarpine taxed the ingenuity of the experimenters, the problem being to render one of the tertiary nitrogens of the base pentavalent by the introduction of a methyl group, without altering the trivalency of the nitrogen of the pyridic group. The nature of this operation will perhaps be better understood after a comparison of the formulæ by which the authors had previously represented the constitution of pilocarpidine and pilocarpine respectively (*Compt. Rend.*, cii., 1117, 1119):—



Pilocarpidine.

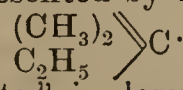


Pilocarpine.

This was eventually attained by oxidizing an iodomethylate of pilocarpidine with silver permanganate, the products being formic acid and pilocarpine. Physiological experiments made on dogs with the synthesised compound showed that its action was identical with that of the natural alkaloid, a very abundant and persistent secretion of saliva being produced.

Amylene Hydrate.

"Amylene hydrate" is the name of the latest addition to the list of hypnotics, which has been made by Professor von Mehring (*Pharm. Zeit.*, July 9, p. 393). The compound that appears to be indicated under this name is prepared from trimethylethylene, one of the several isomeric constituents known to occur in commercial amylene derived from amyl alcohol. It is obtained by treating the trimethylethylene with sulphuric acid, amyl sulphuric acid being formed as an intermediate stage and breaking up on distillation with water, the tertiary alcohol being formed. Its more correct scientific name is dimethylethylcarbinol, and it is also represented by the formula—



"Amylene hydrate" is described as being a clear colourless oily liquid, having a penetrating odour, recalling camphor, oil of peppermint and paraldehyd. It dissolves readily in 19 parts of water and is miscible with alcohol in all proportions. It boils when pure at 102·5° C., though some samples are sometimes met with having a wider range. Upon cooling to −12·5° it solidifies in acicular crystals that melt at −12° C. Its specific gravity at 0° is 0·828 and at +12° C. it is 0·812. This compound appears to be specially liable to contamination with amylic alcohol, which may be detected, if present, by the formation of valerianic acid upon oxidation with potassium bichromate and sulphuric acid. The physiological action of amylene hydrate when administered in average doses is said to extend principally to the cerebrum; but in larger doses the medulla oblongata is affected, reflex action disappears, respiration slackens and finally the heart's action stops. In suitable doses, sufficient to produce hypnotism, neither the respiration nor the heart's action are affected (*Münch. med. Wochenschr.*, July 26, p. 583), and it has been administered without inconvenience to patients suffering from heart affections. As a hypnotic amylene is said to stand midway between chloral hydrate and paraldehyd in respect to potency, 1 gram of chloral hydrate being estimated as equal to 2 grams of amylene hydrate or 3 grams of paraldehyd. In respect to taste it is alleged to present an advantage over paraldehyd, patients taking it more freely, whilst the exhalations after taking it are not so disagreeable. It has been administered in a mixture containing 4 grams of amylene hydrate, an equal weight of ext. liquiritiæ, and 40 grams of water, requiring to be shaken before use. It may also be given as a clyster, made with amylene hydrate, 5 grams; aq. dest., 50 grams; mucil. gummi arab., 20 grams. Sometimes a small quantity of hydrochlorate of morphia has been added with advantage. No unpleasant accessory symptoms have been observed whilst using this compound, and it does not appear to interfere with the digestion.

Bromide of Ethyl.

The value of bromide of ethyl as an anæsthetic in minor surgical operations has recently been the subject of an address by Dr. Pauschinger (*Münch. med. Wochenschr.*, July 26 p. 568). The conclusions drawn by him from the results of several trials was that the compound presents important advantages:—(1) Because its freedom from danger allows of its use in minor, though painful operations in which the use of chloroform would not be justifiable; (2) its easy toleration, which spares the patient the disagreeable phenomena attending the chloroform narcosis; (3) its convenient management, which makes it possible for a practical operator to use it in cases of need without an assistant. These advantages are combined with a rapid and effective anæsthetic action.

Solution of Lithium Salicylate.

An experience met with in dispensing lithium salicylate forms the subject of a note read by M. Julliard before the Paris Société de Pharmacie (*Bulletin*, June, p. 273). The prescription ordered a 5 per cent. solution of lithium salicylate, and M. Julliard, having prepared it from some of the salt in stock, obtained a solution having a cognac colour that he failed to remove by passing it through charcoal. He therefore prepared the salt extemporaneously by exactly saturating lithium carbonate with salicylic acid, and in this way was able to dispense a colourless solution. After a few days some of this solution was brought back free from precipitate, but having the colour of coffee, the patient

protesting that what he had taken had caused a colic. Upon M. Julliard explaining that such a change of colour would necessarily take place with the lapse of time, the customer produced a preparation obtained from another pharmacist that had kept colourless during two months. Application of the flame test showed that a sodium salt was present in this latter preparation, and M. Julliard therefore obtained from different sources five samples of commercial lithium salicylate. Four of these gave solutions that were acid to test paper, and remained colourless a week, the fifth gave a neutral solution, and, like that prepared by M. Julliard, assumed the colour of coffee in the same time. The four acid samples all contained sodium salicylate, which is usually a little acid, and M. Julliard expresses the opinion that commercial samples of lithium salicylate usually contain at least from 12 to 15 per cent. of the sodium salt. Some further experiments showed that the presence of salicylic acid in slight excess retards the coloration of a solution of lithium salicylate.

Calomel Subcutaneous Injections.

The administration of calomel by subcutaneous injection, in the treatment of syphilis, has been reported upon favourably by Dr. Krecke, who states that he has found this method the most certain in its results next to inunction (*Münch. med. Wochenschr.*, No. 6, p. 93). The calomel is simply suspended in water containing an equal weight of sodium chloride, ten per cent. of each being usually used. Care should be taken to shake the bottle before using the mixture, and after the syringe has been filled it should be held with the needle downwards until the injection has been made. From one to two grains of calomel are injected deep in the gluteal region every five or six days. The treatment is also recommended by Dr. Carl Hopp (*Med. Rec.*, July, p. 305), who state that dépôts of calomel are formed at the point of injection from which the perchloride is gradually formed and diffused through the system.

Euphorbia heterodoxa.

The *New York Medical Journal* for June 4 (p. 630) contains a note by James Bairnsfather, M.D., Dayton, Kentucky, who by the way is also a member of the Pharmaceutical Society, in which he reports favourable results obtained with the milky juice and resin of *Euphorbia heterodoxa*, which under the name of "alveloz" has been recommended as a cure for cancer and ulcers of a malignant type (*Pharm. Journ.*, [3], xvi., 245, 510, 614). He states that when the drug is applied an absorption into the system evidently takes place, causing a profuse secretion of highly coloured and offensively smelling urine, and that while this goes on the skin improves in colour, the patients gain in spirits and improvement is manifest in the local affection. Dr. Bairnsfather complains that some samples supplied as "alveloz" are quite inert, and describes the appearance of the active alveloz as being that of pale butter with the consistence of vaselin.

Convallarin and Convallamarin.

The contradictory statements that have been made with respect to convallarin and convallamarin, the reputed active principles of *Convallaria Majalis*, which have both had cardiac properties accredited and denied to them, induced Dr. Nathanson to conduct some clinical experiments with pure preparations of the glucosides (*Med. Record*, July, p. 282). He found that convallarin, administered in the dose of 0·06 to 0·12 gram three or four times daily for three to eight days produced only nausea, diarrhœa and gastric pain. The pulse, breathing, dropsy and excretion of urine remained unaffected or showed unfavourable alterations. On the other hand, convallamarin, administered in daily doses of 0·03 gram increasing to 0·3 gram for eleven to seventeen days, produced in three patients a striking and immediate improvement. The pulse became slower and more regular, the excretion of urine augmented, dropsy decreased and other signs of cardiac disturbance steadily diminished. In one case, however, where other remedies had failed, convallamarin also was nearly inactive. Slight nausea and other inconveniences were observed in two patients when the daily dose had been raised to 0·3 or 0·4 gram daily, but no cumulative action was observed. Dr. Nathanson therefore considers convallarin to be only capable of producing a purgative effect, whilst convallamarin represents a useful cardiac drug, possessing the property of promoting the re-establishment of disturbed compensation and free from unpleasant accessory effects. The contradictory results reported by previous observers he attributes to the use of impure preparations.

Resin of Thapsia Villosa.

Thapsia resin has acquired in recent years a considerable reputation in France as a material for revulsive plasters, and the resin and a *sparadrap de thapsia* are now included in the Codex. The resin is obtained by exhausting with strong alcohol the roots of *Thapsia garganica*, and as this plant is becoming somewhat scarce in consequence of improvident collection, Messrs. Heckel and Schlagdenhauffen were induced to investigate the allied plant *Thapsia villosa*, L., to ascertain whether it yielded a resin having similar properties (*Nouv. Rémèdes*, June and July, pp. 267, 295). The results were affirmative, the roots of *T. villosa* yielding to chloroform and to petroleum spirit a resin possessing vesicant properties, whilst, on the other hand, the alcoholic extract did not prove vesicant. Some comparative experiments made with plasters prepared from the resins from the roots of the two plants showed that the *T. villosa* resin acted more slowly and gently than that from *T. garganica*, and rather as a rubefacient than as an eruptive; but, in compensation, the *T. villosa* resin does not appear to determine the insupportable pruritus that sometimes attends the application of the official plaster.

Lobelia syphilitica.

The last number of the 'Drugs and Medicines of North America' (vol. ii., No. 4), just received, contains an account of several plants of comparatively little importance in medicine, but which have had a passing reputation for possessing therapeutic value. Among these are *Lobelia syphilitica*, which in spite of its name is not found in commerce in the United States, and is not used in domestic medicine, and the plant being insipid and herb-like the authors have not considered it worthy of further investigation.

Lobelia cardinalis.

Lobelia cardinalis, although it has been shown by Procter to contain an alkaloid, is also briefly noticed, since it is not now used in medicine. *Lindera Benzoin* is stated to have no commercial history, to be very sparingly employed, and to owe any properties it possesses to an aromatic volatile oil. *Diphylleia cymosa*, a plant nearly allied to Epimedium, but bearing the name

Lindera Benzoin.

of "southern May apple," and supposed to possess properties similar to those of podophyllum, has been investigated in the Cincinnati Hospital and the Miami Medical College, but without any important results being obtained. The bark of *Cercis canadensis* is reported by the authors to contain neither alkaloid nor glucoside, but a considerable quantity of a tannin, giving a blue precipitate in dilute ferric solutions; it is not likely to supersede other astringents used in medicine. The most important of the plants mentioned in the present number is *Scrophularia nodosa*, which appears to be used by the Eclectic and Homœopathic schools of medicine as an alterative in diseases of the lymphatic system and in cutaneous affections. The authors point out the curious fact that the nodular swellings of the root of the European plant are entirely absent from the American one so far as they have been able to ascertain. The plant owes its name of figwort to the fact that it was used in the disease called "ficus;" *Ranunculus Ficaria*, in like manner, owing its specific name to a similar use. A chemical examination of the root by the authors showed that it contains an alkaloid, but this is present in very small quantity, and is odourless and tasteless, or nearly so. A resin of peppery taste was, however, obtained from the root and appears to be its most active ingredient. A fixed oil extracted from the root does not possess any pungency. The American plant is known to the Eclectics under the singular name of carpenter's square, presumably from the square shape of the stem.

Diphylleia cymosa.

Cercis canadensis.

Scrophularia nodosa.

Under *Erechtites hieracifolia*, Raf., or fireweed, the remarkable statement is made that the volatile oil sold in America under the name of oil of fireweed is that of *Erigeron canadense*. It is used chiefly by the Eclectics. According to the authors the name should be spelt Erechtites, not Erechthites. The former is the original spelling, and the other, although adopted by Bentham and Hooker and Gray, has been corrected by the latter author in his recent 'Synoptical Flora.'

Erechtites hieracifolia.

Mr. J. R. Jackson, of Kew, has published a note in the *Gardeners' Chronicle* on a medicinal tea which has attracted some attention of late under the name of "Serkys tea," it being said to improve digestion and clear the complexion, prevent skin diseases, etc. An infusion of the broken leaves was found to have the odour and flavour of sage, and seeds of a species of Chenopodium (*C. ambrosioides*) were detected by Professor Oliver. The preparation appears to vary in composition, since a sample, examined by the writer, had a distinct flavour of green mint. Serkys tea, according to a well-known Turkish scholar, means simply St. George's tea.

Serkys Tea.

Tincture of *Cannabis indica* is recommended in the *Practitioner* (July, p. 9) by Drs. F. F. Bond and B. E. Edwards in the treatment of summer diarrhœa. It is stated to possess the advantage of not interfering with the digestive functions, but on the contrary to accelerate their return. The dose given is ♏x. in conjunction with other remedies.

Cannabis indica.

Spigelia marilandica is so commonly used in some parts of England as a vermifuge that it is important to remember that it is not altogether harmless. Experiments recently made by Dr. A. H. Hare (*Pract.*, July, p. 61) show that it possesses poisonous properties allied to those of gelsemium, depressing the action of the heart and of respiration and causing loss of muscular power, when given in large doses.

Spigelia marilandica.

At a meeting of the Société de Biologie M. Laborde gave an account of two arrow poisons used by certain tribes in Africa. One of these poisons is called "hippo," and is employed by the Sakayes and Somangs. It causes vomiting, then tetanic convulsions, and a simultaneous arrest of the respiration and cardiac action, followed by death. The other is called "vakamba" and produces very similar effects, but its tetanic action is always less violent, though it seems to cause muscular contraction more rapidly than the hippo. It is a curious coincidence that the name of "ipoh" is applied by the Malays to *Strychnos Tieute*, the arrow poison of Java, etc. (*Archives de Pharm.*, p. 324).

African Arrow Poisons.

Two new alkaloids have lately been discovered by Giacosa and Monari in artar root, a drug obtained from the west coast of Africa. One of these alkaloids is present in considerable quantity, and is soluble in ether, but not in water; it is apparently uncrystallizable and forms yellow salts with sulphuric, hydrochloric, and nitric acids, but does not show the reactions of berberine. The other is present in smaller quantity and crystallizes in fine red laminæ, is soluble in water and forms yellow salts with acids. The first alkaloid causes muscular irritability with coagulation of myosin and spasmodic movements like those produced by veratrine. When given internally it causes considerable slowing of the heart's action with increase of energy; this slowing is independent of the vagus and other inhibitory nerves of the heart (*Pharm. Centralh.*, No. 25, p. 314). A specimen of artar root was sent some months ago to this country by Dr. Easmore, accompanied by the leaves of the plant; the latter evidently belonged to *Xanthoxylum senegalense*. It may therefore be supposed that the root should be allied in properties to prickly ash bark (*Xanthoxylum fraxineum*).

Artar Root.

A crystalline alkaloid, obtained from *Ustilago Maydis*, or "corn smut," a fungus which is official in the United States Pharmacopœia, has been described by Messrs. Rademaker and Fischer (*Nat. Drug.*, June 17, p. 296). It was separated by exhausting ustilago with dilute alcohol, allowing the alcohol to evaporate spontaneously, adding a little sulphuric acid to the aqueous liquor, dialysing for twelve days and evaporating the dialysate to dryness at a low temperature; the residue after washing with absolute alcohol, was dissolved in water, treated with excess of caustic potash and the liquor shaken with ether, which after separation left the alkaloid on evaporation as a crystalline residue. The alkaloid, for which the name "ustilagine" is proposed, is said to be white, to have a bitter taste and to be soluble in ether, alcohol and water. It yields crystallizable salts, the acetate crystallizing in long slender needles, and the salts are also soluble in water. Amongst the other constituents of ustilago mentioned by the authors are trimethylamine and sclerotic acid.

Ustilagine.

It was already known that anethol, or anise camphor, besides being the principal constituent of the essential oils of anise and fennel, occurs in other essential oils, such as that distilled from the leaves of *Artemisia Dracunculus*. Another source of the compound has been added to the list by Mr. Eberhardt, who has obtained it from the root of the umbelliferous plant, *Osmorrhiza longistylis*, known in the United States and Canada as "sweet cicely," "sweet root," "paregoric root," and "sweet anise," and to some extent used popularly as a mild carminative and expectorant in the form of infusion and fluid extract (*Pharm. Rundsch.*, July, p. 149). The distillate obtained by Mr. Eberhardt consisted chiefly of a heavy portion, sp. gr. 1·0114 at 10° C., with a small quantity of a lighter portion floating at the top. The lighter portion contained a hydrocarbon having a composition represented by the formula $C_{10}H_{12}$, but consisted principally of anethol. The larger portion submitted to fractional distillation commenced to boil at 189° C., but the thermometer rose immediately to 225° C., and eventually to 280° C. The greatest quantity of distillate, however, passed over between 225° and 230° C., and consisted of nearly pure anethol, from which anisic acid identical with the acid given by anise anethol was obtained by oxidation. The oil itself, the yield of which amounted to 0·63 per cent. (presumably from the dry root), is described as resembling in odour and taste a mixture of not very pure anise and fennel oils. It formed clear mixtures with alcohol (sp. gr. 0·830), ether and chloroform. Liqueurs to which it had been added could be easily distinguished, through having a somewhat acrid after-taste, from those in which the ordinary oil of anise or star anise had been used, and they lost their aroma more quickly. The oil of *Osmorrhiza longistylis* was distilled five years ago by Mr. H. L. Green, who remarked upon its similarity in appearance to oil of anise (*Pharm. Journ.*, [3], xii., 999).

Oil of Osmorrhiza longistylis.

In examining some mixed powders, supposed to contain alkaloidal matters as well as cubebs, by the Stas-Otto method, which consists in extracting first with alcohol containing tartaric or oxalic acid, and then heating the extract with alcohol and ether, it was found that the residues from the treatment with ether always gave reactions resembling those of aconitine and digitalin, though these compounds were not present. Professor Schaer was therefore induced to take up the investigation of cubebs, and came to the conclusion (*Archiv*, June 30, p. 531) that the alkaloid-like reaction is referable to cubebin, the crystalline neutral non-nitrogenous principle that is known to have its principal seat in the pericarp of the fruit. He found that the ethereal extracts from either new or old cubebs, freshly powdered or not, alway contained a substance—cubebin—that gave reactions simulating, in some respects, certain colour reactions of veratrine, aconitine, morphine and digitalin, though it could not be said the reaction was absolutely identical in any case. It has long been known that cubebin gives with sulphuric acid a red colour resembling that given by salicin, and Professor Schaer's paper gives fresh illustrations of the risk there is of drawing false conclusions from colour reactions in the present imperfect state of knowledge of the subject. It will be remembered that in a paper, read before the British Pharmaceutical Conference last year, Messrs. Braithwaite and Farr reported the observation of indications of the presence of two alkaloids in the ethereal extract of a false cubebs (*Daphnidium Cubeba*), and in the discussion that followed, it was suggested this observation might be utilized as the basis of a test for the presence of such a sophistication in cubebs powder. Should, however, this suggestion be acted upon it would be necessary when testing for the alkaloid to bear in mind Professor Schaer's experience.

Cubebin Reaction.

In a report upon some obscure cases of poisoning by milk that occurred last year at a military station in India, Surgeon R. H. Firth describes some observations that confirm strongly the conclusions arrived at by Dr. Vaughan (*Pharm. Journ.*, [3], xvii., 147) as to the formation in milk under certain conditions of a ptomaine possessing poisonous properties. Mr. Firth's attention was drawn to the subject by the fact that a number of men in the military hospital and prison, who had been supplied with milk, had been seized with nausea, vomiting, dryness and intense constriction at the fauces, vertigo, colic, purging, and tendency to collapse (*Practitioner*, July, p. 75). Inspection of the dairy from which the milk had been derived revealed nothing except that some of the utensils were markedly unclean; the cows appeared healthy, and the residue of the suspected milk upon analysis showed: specific gravity, 1025; solids not fat, 9·6; casein, 4·1; fat, 3·9; milk sugar, 5·04. The milk was subjected to a careful microscopical examination, but except some common forms of oïdium and penicillium no organisms could be discovered to which the toxic action could be attributed, and Mr. Firth was therefore led to suspect the formation of a ptomaine. Upon filtering some of the milk, rendering the acid filtrate alkaline with potassium hydrate, and shaking with ether, a crystalline residue was obtained on the evaporation of the ether that produced symptoms similar to those observed in the sick men. An attempt to ascertain the conditions under which this crystalline substance might be formed was made by exposing a series of previously analysed milks to a temperature of 75° F., and examining from time to time for the toxic products; but only negative results were obtained until about the seventy-fifth day, when one sample that was rather rich in fat yielded a white acicular crystalline substance having the same odour and taste as the original specimen, and which produced vomiting, purging, frontal headache and collapse. About 3 milligrams of this substance injected into the lymph sac of a frog produced in a few minutes a paralysed condition, the heart beating more slowly, though energetically, until arrested in diastole; this action was found to be counteracted by the application of atropine. The physiological action generally on animals was found to resemble that of muscarine. The same substance was also produced at the end of only four days by suspending a small piece of stale butter in a sample of ordinary milk that did not otherwise yield it kept at a temperature of 80° F. Mr. Firth therefore infers that the toxic substance is a ptomaine, the formation of which is probably dependent upon the action of butyric or some other acid on decomposing nitrogenous matter at a temperature of 80° F., or upwards. Mr. Firth proposes for the substance isolated by him the name "lac-

The Milk Ptomaine.

totoxine," but there can be little doubt that it is identical with that previously named by Dr. Vaughan "tyrotoxicon."

Syntonipepsin.

In a paper recently submitted to the Belgian Royal Academy of Medicine on "syntonipepsin" in relation to the chemical theory of digestion, Dr. Chandelon gives his conclusions as to the constitution and mode of action of the peptic ferment (*Journ. de Pharmacol.*, June, p. 277). According to these the phenomena of gastric digestion take place in the following order. First, the pepsin reacts upon syntonin, oxygen being eliminated and "syntonipepsin" formed. Secondly, under the influence of dilute acid syntonipepsin is decomposed, giving rise to the formation of peptone and zymogene. The third stage is the fixation by the zymogene of oxygen set free in the first reaction, resulting in the regeneration of the ferment. According to the Commission to whom the paper was referred, these conclusions have been experimentally confirmed. The "syntonipepsin" isolated by Dr. Chandelon is described as being completely soluble in dilute hydrochloric acid, with the production of peptone and zymogene, whilst the solution of zymogene upon being shaken in contact with air takes up oxygen and acquires an intense digestive power.

Pepsin and Alcohol.

It is generally accepted as having been demonstrated in laboratory experiments that an alcoholic liquid is not a suitable vehicle for the administration of pepsin, on account of the property of alcohol to render latent the activity of the ferment, although it has been contended, on the other hand, that the rapid absorption of alcohol by the stomach diminishes the importance of this property. Some experiments recently communicated to the Société de Thérapeutique by M. Bardet, the object of which was to determine the effect of alcohol upon the solubility of pepsin, and whether it permanently affected the fermentative powers, seem to advance knowledge of this subject a little further (*Nouv. Rémèdes*, June, p. 243). M. Bardet found that upon treating 10 grams of fresh pepsin with 75 grams of distilled water the residue that remained undissolved amounted to 4 per cent. Upon pouring in an equal quantity of alcohol the precipitate raised this quantity of undissolved matter to 20 per cent., but when the pepsin was treated directly with a warm mixture of equal quantities of alcohol and water the undissolved matter fell below 10 per cent., and became comparable with the result obtained with distilled water only. If this proportion of alcohol were exceeded the insolubility increased rapidly. With respect to the permanent effect of alcohol on pepsin, it was found that in an alcoholic liquor containing not more than 20 per cent. of alcohol pepsin might remain indefinitely with impunity; but with larger proportions of alcohol, from 25 to 70 per cent., the permanent loss of activity was rigorously proportional, until at the latter strength the ferment was killed. The inference drawn is that elixirs and similar preparations of pepsin should never be made of higher alcoholic strength than 20 per cent. It must also be remembered that these results were obtained with mixtures of alcohol and water, and probably would not hold good for a wine containing tannin.

Some interesting observations have been made by M. le Comte du Buysson on the vitality of seeds.

Vitality of Seeds.

His experience shows that it is an advantage to soak seeds of doubtful germinating power for thirty-six hours in some liquid containing nitrogen, *e.g.*, a gram of guano to a litre of water, since the germinating power of a seed is proportionate to the amount of nitrogen it received during its formation, and which it has retained during its period of dormant activity. If it be desired to preserve the vitality of seeds for any length of time it is necessary to prevent heat and moisture from affecting them, since these are agents which facilitate germination (*Gard. Chron.*, July 9, p. 49).

Germination of Seeds.

The variation in the period that may elapse between planting and germination of seeds, of which henbane seed is a well-known instance, has lately been shown to exist also in the case of the Brazil nut. From experiments made at Kew it appears that while some of the seeds sown germinated in a few weeks, others did not germinate for two years (*Gard. Chron.*, July 9, p. 50).

New British Scale Moss.

In the *Journal of Botany* for July a new scale-moss is described by Dr. Spruce under the name of *Radula Holtii*. It is a small species about half an inch in length, and is remarkable for its terete perianth and fragile stems.

Anastatica hierochuntina.

The well-known botanical curiosity, *Anastatica hierochuntina*, better known as the rose of Jericho, owes its property of expanding in water, according to M. Leclerc du Sablon, to the fact that one side of the cells (the external) consists of pure cellulose, while the inner side is lignified, the cellulose absorbing much water and the lignin very little, so that a difference in the form of the cells owing to unequal swelling is thus produced (*Gard. Chron.*, July 9, p. 51).

The Ascent of Sap.

In a paper lately read before the Royal Botanical Society of Edinburgh by Mr. G. F. Scott Elliott, on "The Ascent of Crude Sap," the author asserts that crude sap travels in the lumen or cavity of cells and not within the walls of the vessels and tracheids as Sachs supposed. Transpiration ceases if the lumina are closed by injection or by strong compression of the stem, although continued when the cell walls are changed to gum. He regards Dufour's experiments with bent twigs as quite fallacious. If air be present in the vessels it can only be the case during the day at the time of the greatest loss of water, since the vessels form a close system and wet cell-walls are impervious to air; he considers it physically impossible that air bubbles can give any active assistance in the process. It is impossible at present to calculate the separate effects of capillarity, root-pressure, osmosis and transpiration in causing the ascent of crude sap.

Edible Fungi.

Further experiments by Herr F. Kohmer confirm recent statements that the nutrient properties of edible fungi have been greatly overstated. In *Boletus edulis* he finds that of the nitrogen present only 72·26 per cent. is in the form of the albuminoids, the rest exists as ammonium salts, or in some other form useless for nutritious purposes. Similar results were obtained from the champignon and truffle. In *Boletus edulis* in the fresh state, there is 90 per cent. of water, and only 2·3 per cent. of albuminoids.

The Pharmaceutical Journal.

SATURDAY, JULY 30, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DOES NOT THE PHARMACY ACT REQUIRE A PERSONAL QUALIFICATION?

IT is not a little strange that, at the present time, when the possession of specific technical qualifications are beginning to be generally recognized as indispensably requisite for the successful and satisfactory practice of various arts, the necessity for such qualification on the part of the compounders of medicine and the sellers of poison should appear to have carried so little weight with the judges who have been applied to for administration of the law relating to this matter. There can be no question that from a pharmaceutical point of view the object of legislation affecting the practice of pharmacy was to ensure adequate practical qualification of the individuals engaged in that occupation. In the first place it was held to be expedient that the individuals carrying on business on their own account should possess a qualification fitting them to assume the title of pharmaceutical chemists, and to occupy the position of the proprietors and responsible heads of pharmaceutical establishments, and in the second place, those acting in the capacity of assistants were required to possess a qualification inferior in degree to that of a pharmaceutical chemist, only because they would in ordinary practice be engaged in the operations of compounding medicines and dispensing under the superintendence of the principal. This was undoubtedly the aim of the founders of the Pharmaceutical Society, and the idea of the necessity for personal qualification of every individual engaged in pharmaceutical practice is the fundamental principle of the Society's Charter of Incorporation and of the Pharmacy Act of 1852.

It is equally true that the Act of 1868 was inspired by the same idea, but the conflicting influences brought to bear upon the Legislature at the time that Act was passed have in various ways left their mark upon it, so that its provisions are less calculated for securing the original objects of the Society than they might otherwise have been. Still the preamble of the Act, specifying what is expedient for the safety of the public, clearly shows that its provisions were intended to apply to the proprietors of shops kept for retailing, dispensing and compounding, and it is the more evident that this was the contemplated intent of the Act at that time, since the necessity for the qualification of persons acting in the capacity of assistants was not included among the conditions provided for by that Act. It was the person who kept an open shop for "retailing, dispensing or compounding," or, in other words, the proprietor of a business, who was required by the first section of the Act to possess a pharmaceutical qualification to render his doing so lawful, and the further provision of the same section, that it should be unlawful for any person to sell poison unless qualified in accordance with the terms of the Act may be reasonably understood as intended to confine such transactions to the shops kept by duly qualified persons. The only part of the Act where qualification on the part of any other person than the proprietor of a business is mentioned, as being sufficient for the purpose of the Act, or declared to be requisite for that purpose, is the 16th section, and there it is only in reference to the case of the proprietor of a business having ceased to exist that provision to this effect is made. Here again the intention of the Act appears to be manifestly that of requiring the qualification of the proprietor, and it is only for the purpose of meeting the contingencies following his decease, and at the same time securing the public object of the Act, that provision is made to allow a duly qualified assistant to act for a time as his substitute. And there is yet another indication presented by the Act that the personal qualification of the proprietor of a chemist and druggist's business was desiderated, for in the 17th section, which repeats the provision of the 1st section that it shall be unlawful to sell poison, and at the same time specifies the precise conditions under which the sale of poison is to be made, it is particularly stated that for the purposes of the Act the person on whose behalf any sale is made shall be deemed to be the seller, and consequently the person liable to a penalty for infringement of the law. It would appear that the only reasonable explanation for this provision is to be found in the fact that the Act requires the proprietor of a business to be qualified. According to the 1st and 15th sections, it is in virtue of the proprietor's qualification to keep open shop that the sale of poison in his shop is a lawful act; he is, in fact, the person responsible for any neglect by an apprentice or servant of the regulations referred to in the 15th and 17th sections.

But the importance of the requirement of personal qualification on the part of the proprietor of a business has been too much lost sight of since the prosecution of the London and Provincial Supply Association, and we are disposed to think that the actual bearing of the law on this point has been obscured by judicial expressions of opinion as to what might be deemed sufficient for the purposes of the Act so far as the safety of the public is concerned. It has been assumed that the qualification of an assistant so far provides security to the

public as to atone for infringement of the law on the part of the proprietors of a business. But, however that may be, in point of fact it does not appear to be a question that calls for consideration. The qualification of a chemist and druggist's assistant is not required by the law as it exists, but the law does require qualification on the part of the proprietor of a chemist and druggist's business, and the real question is whether this provision of the law is to be upheld or not. The judgment given on the appeal in the case of London and Provincial Supply Association by the Lords Justices was really given upon a purely technical point of law which had nothing whatever to do with the questions of real importance as regards the safety of the public or the detriment to chemists and druggists from the unlawful keeping open shop for retailing, dispensing and compounding, etc. But while the appeal was both sustained by the Lords Justices and subsequently confirmed by the House of Lords, solely on the narrow ground that a corporation could not be held as covered by the term "person" in the Act, much significant difference of opinion prevailed as to the circumstances under which that view was admissible and great opportunity was afforded for considering the matter in other respects that were outside this special legal view, but were perhaps of more vital importance. Thus, for instance, though Lord Bramwell took the view that a corporation was outside the scope of the Pharmacy Act, he admitted that if there were strong reason for saying that "person" meant corporation, one ought so to hold, and Lord Baggallay also held that such an interpretation might and ought to be adopted if it were clear from the general scope and purport of the Act that selling, dispensing, or compounding of poisons by a corporation was, or might be, within the mischief intended to be guarded against, and if an extension of the meaning of the word "person" so as to include corporations would afford protection. Lord Thesiger again admitted that he was long in doubt whether the judgment of the Court below might not be supported upon that view, and he further expressed the opinion that a statutory provision under which a particular thing is made unlawful, except upon certain conditions, contains an indication that the thing is intended to be entirely prohibited except upon those conditions, and consequently it could not be done by a corporation if the conditions were such that only individuals could comply with them. As regards the individual members of a company, Lord Bramwell thought they would not be altogether free from liability for an offence committed by the company in its corporate capacity, and one of the illustrations made use of by him may almost be regarded as pointing to the mode of procedure that has been adopted in the Leith Depôt case. How, he asks, is the keeping open shop to be reached? The servants do not keep it open, but the directors or managers do, and they are the offenders in that case. The Scotch judges appear to have been influenced more by the precedent of the House of Lords' judgment than by these side views of the matter, which serve to show that it admits of being very variously regarded. The report of the arguments of counsel in the Leith case, which appears in the present number, will be found to present a striking illustration of this circumstance.

THE BRITISH PHARMACEUTICAL CONFERENCE.

The meeting of the British Pharmaceutical Conference in so important a city as Manchester, under the presidency of Mr. S. R. Atkins, J.P., and the concurrent attractions of the Exhibition now open there, will no doubt ensure a very large attendance of members, and it may be regarded as certain, that under the able management of Mr. Benger, the Honorary Local Secretary, the provision for their entertainment will be most efficient.

Applications for the two tickets required must be made before the 22nd August, and they must be accompanied by a corresponding remittance, viz., of five shillings for the ticket for the reception and conversazione, the luncheon and conveyances, on Tuesday and Wednesday, and the smoking concert on Wednesday evening, and of ten shillings for the ticket to the excursion on Thursday to Matlock, including railway, lunch and carriage drive.

At a Special Council Meeting of the Pharmaceutical Society of Ireland, held on July 22, Mr. Charles Evans was elected a member of Council in the room of Mr. John Evans, resigned.

* * *

On Friday morning, the 22nd inst., at the conclusion of the lecture at the Royal Botanic Gardens, an address was presented to Professor Bentley on the occasion of his retirement from the Chair of Botany in the School of Pharmacy of the Pharmaceutical Society of Great Britain. The address was signed by the members of the Botany and Materia Medica class of the present session, and the presentation was made on their behalf by Mr. Edmund White, Bell Scholar. Professor Bentley acknowledged the compliment in suitable terms, and whilst exhorting his hearers to work diligently during the hours allotted to study, advised them not to allow study to encroach upon proper hours of relaxation. The address was as follows:—

"We the undersigned students of the School of Pharmacy of the Pharmaceutical Society of Great Britain, present this address to Professor Bentley on his retirement from the chair of Botany and Materia Medica, as a token of our sincere regard and esteem. It is our fervent hope that he may be long spared to enjoy his well earned rest from active labour. We wish at the same time to express our deep regret at the severance of the connection which has existed so long between Professor Bentley and the School of Pharmacy."

* * *

The adjourned debate in the House of Commons upon going into committee to consider the Pharmacy Acts Amendment Bill, was on Monday evening again postponed until Wednesday, the 10th of August.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 13, 14, 15, 19, 20, 21 *and* 22, 1887.

Present on the 13th, 14th and 15th.—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner and Taylor.

Present on the 19th, 20th and 21st.—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Present on the 22nd.—Mr. Carteighe, President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 14th, 15th, 19th, 20th and 21st on behalf of the Privy Council.

MAJOR EXAMINATION.

13*th.*—*Eight* candidates were examined. *One* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Brumwell, Charles Wesley.....Lincoln.
Buchanan, Margaret Elizabeth.London.
Cairns, Frederic Arthur.....Birkdale.
Coleman, Frank Henry .....Chapel Brampton.
Cooper, George Thomas .....Market Bosworth.
Fields, Tom William .....Beverley.
Phillips, Alfred James.....Truro.

14*th.*—*Seven* candidates were examined. *One* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Davies, Edward Chas. James...London.
Lance, Henry .....Bow.
Tench, Sidney Edward .....Brighton.
Thomas, John .....Oswestry.
Williamson, Leonard Wright...Darlington.
Wokes, Thomas Siminson .....Hull.

MINOR EXAMINATION.

13*th.*—*Twenty-four* candidates were examined. *Thirteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Acton, Frederick George .....Worcester.
Allott, Gilbert Hawkins N. ...Peterborough.
Alvey, William Smith ....Nottingham.
Andrew, Charles William .. ...Penzance.
Ashfield, Armishaw.....Stratford-on-Avon.
Baldwin, George Joseph .....Loughborough.
Barrett, John Richard.....Devonport.
Batchelor, William .....Stalybridge.
Bellamy, Robert Arthur .....Bedale.
Birkett, Frederic Joseph .....Workington.
Morrison, John Wm. Thomas..Upper Holloway.

14*th.*—*Twenty-six* candidates were examined. *Fourteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bostock, John .....Wilderspool.
Broomfield, Walter Henwood...Monmouth.
Cain, James Harold ....Douglas.
Carr, Tom Wormald .....Knaresborough.
Carruthers, Ernest Murray.....Cambridge.
Caswell, Joseph Alban .....Sedgley.
Charlesworth, Moorhouse .....Saltaire.
Clough, Thomas .....Liverpool.
Cragg, Thomas.....London.
Dauncey, George ....Wotton-under-Edge.
Davies, David .....New Quay.
Duck, Walter George .....Cardiff.

15*th.*—*Thirty-one* candidates were examined. *Nineteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Eberlin, Albert .....Sheffield.
Ferriday, Arthur Harry.....Oakengates.
Ferryman, Herbert .....Rugby.
Giles, William .....Wallsend.
Glendinning, Robert .....London.
Goodfellow, Edward .....Thrapston.
Gray, Arthur Underwood .....Rothwell.
Green, Joseph Hy. Benjamin....Swindon.
Grice, Joseph Edward Brindley.Brighton.
Ground, Thomas .....Birmingham.
Harrison, Arthur John .....Nottingham.
Smith, Alexr. Cyril Thompson..Horselydown.

19*th.*—*Thirty-three* candidates were examined. *Nineteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Andrews, Charles Russell .....London.
Chapman, John .....Bedford.
Cox, Arthur Wellesley .....Yeovil.
Higgins, Charles Alfred.....Manchester.
Hoare, William Herbert.....Windsor.
Holden, George Henry .....Walsall.
Islip, Charles Cater..... .....St. Leonards.
Jeffries, Gilbart .....Guildford.
Jenkins, John .....Pembroke.
Jones, William.....Aberystwith.
King, Arthur Hill .....Maldon.
Kirkup, George John .....Newcastle-on-Tyne.
Lenton, Joseph.....Hastings.
Lister, William Benjamin .....London.

20*th.*—*Thirty-two* candidates were examined. *Seventeen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, Alfred John Edward ...St. Austell.
Chapman, Thomas William ...Birmingham.
Cox, Frederick Hudson .....Southampton.
Hanson, Arthur William.....Devonport
Jackson, Richard Herbert .....Hull.
Markham, Walter .....Spalding.
Marshall, H. Bingham Kendall..Hardingstone.
Metherell, John ..... London.
Owen, Henry Jenkin .....Llandyssul.
Palmer, James Taylor .....Cambridge.
Parker, Edward .....York.
Parry, John .....Talgarth.
Pater, Edward Rhodes .....Newark.
Pattinson, William .....Hexham.
Todd, Edwin Hodgson.....Carlisle.

21*st.*—*Thirty* candidates were examined. *Fifteen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Palmer, William Mortlock .....Meldreth.
Parker, Frederick John .....Chorley.
Penny, John.....Workington.
Pérodeau, Edward George .....Plymouth.
Potter, Herbert Mills .....Walsall.
Price, Thomas Harry .....Brecon.
Reid, David .....Bathgate.
Roberts, Herbert.....Halifax.
Shaw, John .....Bradford.
Shera, William Arthur .....Horncastle.
Shillcock, Sydney.....Bromley.
Slinn, Albert Edward.....Rhyl.
Spink, Harry Laing.....Westminster.
Thomas, Dan .....Hafod.
Wilson, George Waite.....Boston.

22*nd.*—*Thirty* candidates were examined. *Nineteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Anderson, Edward Ellice .....Portobello.
Brassington, Herbert William..Rugeley.
Price, Walter .....London.
Robins, Harry Hollies.....Dudley.
Stewart, Thomas Henry .....Penzance.
Strick, John Richards.....Penzance.
Taylor, Frederick Kaye .....Bradford.
Thomas, Henry Owen .....Rhyl.
Tite, John Reynolds .....Towcester.
Wilkes, Thomas .....Shrewsbury.
Wilson, John Codnor .....London.

MODIFIED EXAMINATION.

15*th.*—*One* candidate was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Roberts, Francis ....Durham.

PRELIMINARY EXAMINATION.

22*nd.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Archer, William .....Guiseley.
Blackman, Percy.....Southampton.
Clarke, John George .....Bury St. Edmunds.
Eglington, Malkin de Kerdistone Yarmouth.
Garner, James Norman .....London.
Jones, Geoffrey Stuart .....Monmouth.
Rainier, Edith Luna Jones.....Leamington.
Seccombe, Charles William ...Southampton.
Tayler, Ernest Walker .....Tewkesbury.
Tilsley, John.....Bath.
Tonge, Charles Bursall .....Gravesend.

The report of the College of Preceptors on the examination held on July 12th was received.

Three hundred and seventy candidates had presented themselves for examination, of whom *one hundred and seventy-four* had failed. The following *one hundred and ninety-six* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Andrews, George Frow .....Eastbourne.
Bamford, William .....Rochdale.
Banks, James Carter ....Stockport.
Barritt, Wesley ....Rotherham.
Barry, William Wellsted.....Rye.
Bates, Betsy Helen .....Oldham.
Baudwin, Raymond Farnese ...New Southgate.
Bell, Robert Armstrong .....Wigton.
Bell, Robert Henry .....Sunderland.
Bell, William .....Edinburgh.
Birkett, Charles William...Bowness-on-Windermere.
Brawn, Harry Samuel.....Spalding.
Brett, Thoroton Pocklington ...York.
Briggs, Robert Spencer .....Sunderland.
Brown, Herbert Cecil .....London.
Brunton, George Joseph.....Brighton.
Burch, Thomas William .....Manchester.
Buse, John, jun. ....Cardiff.
Cameron, James Ellison .....Inverness.
Cannon, Frederick William ...Aylesbury.
Carr, Harry J. ..... Brighton.
Carter, David Jos. Horton .. ...Leicester.
Carter, James Charles.....Hastings.
Carter, Oliver Chas. Youel.....Maidstone.
Chadwick, George Frederick...Northwich.
Chopping, Arthur.....Colchester.
Clarke, John F. M. ....Chertsey.
Close, Arthur Charles.....Hull.
Cooper, Thos. Henry John.....Barton-on-Humber.
Couldery, George Etches .....Reading,
Cowie, Peter..... .....Macduff.
Cox, Edmund George .....Sheffield.
Cox, William Francis ....Hipperholme.
Craft, John Arthur .. ..Reading.
Culver, George Frederick .....Ashford.
Dalton, Thomas Duncan.....Newcastle-on-Tyne.
Darroll, George .....Thame.
Davidson, Geo. Hutchison .....Banchory.
Dawson, George James .....York.
De la Rue, Frank Herbert.....Guernsey.
Dewar, Thomas .....Lochgelly.
Donaldson, George .....Portsea.
Douthwaite, Harry Fryer .....Charlbury.
Dryburgh, David .....Cowdenbeath.
Duff, William.....New Thornton Heath
Duffton, Robert .....Huntly.
Dufty, Lawrence .....Sheffield.
Dunbavin, James A. .....Flint.
Dunning, Matthew .....Glasgow.
Egglestone, Alfred Ernest .....Leeds.
Elgie, Simon Kelsey .....London.
Evans, Alfred John.....Bath.
Evans, Griffith Lewis .....Pantgwyn.
Fairweather, Wm. Ernest .....Manchester.
Field, John Faram Victor .....Batley.
Firmin, Harold James P. .....Bromley.
Flint, Walter ....Stratford-on-Avon.
Francis, Thomas Hamer .....Caersws.
Gartside, Fred .....Chadderton.
Grierson, Samuel .....Dumfries.
Hallam, Frank .....Burton-on-Trent.
Hargreaves, Bernard .....Preston.
Harper, Florence Jane .....Birmingham.
Harrold, William Malcolm ...Forres.
Harvey, Herbert .....London.
Hemensley, Albert P.....Douglas.
Hickes, Charles Edward .....Pocklington.
Hindle, Maurice Warburton ...Wirksworth.
Hines, Herbert Charles .....Norwich.
Holloway, Harold Edgar .....Redruth.
Hopkinson, Walter .....Leicester.
Howorth, Henry .....Preston.
Hunt, Frederic Hastings .....London.
Hutchings, E. .....Southsea.
Irving, William John .....Hawick.
Jackson, Thomas B. .....Kendal.
Jewell, Harry .....Salisbury.
John, Alfred.....Swansea.
Jones, Jacob James.....Llandyssul.
Jones, John Emrys.....St. Asaph.
Jones, Thomas..... .....Llandyssul.
Judge, Arthur ....Belper.
Kellett, William Herbert .....Bolton.
Kendrew, Walter .....Boston Spa
Lamb, William Henry .....Whitby.
Landor, William Ernest.....Weymouth.
Langley, John Inman.....London.
Laudels, Charles Coney .....Portobello.
Lee, John Edward ....Hull.
Leslie, Robert .....Rothienorman.
McCormick, William .. ..Newton Stewart.
McDowall, David .....Ibrox.
Macey, Thomas .... Southampton.
Macpherson, James.....Boat-of-Garten.
McVittie, David John .....Langholm.
Marchant, David... .....Eastbourne.
Marlow, Walter Searle .....Wantage.
Massie, John.....Midmar.
Maver, James .....Birnie.
Mayne, Anthony .....Wotton-under-Edge.
Midwood, Edwin .....Liversedge.
Milligan, Alfred James .....Dalbeattie.
Milne, Alexander Gordon .....Aberdeen.
Mirrilees, Arthur Houldsworth Lasswade.
Mollison, William Whyte .....Aberdeen.
Morgan, Arthur .....Stockton-on-Tees.
Murray, John .....Hawick.
Neave, Reginald Gundry.....Leiston.
Nicholson, James.....Haverfordwest.
Noble, Alexander P. .....Loanhead.
Oliver, Irwin.....Liverpool.
Orme, Herbert Richard .....Atherstone.

Osborne, Albert .....Hounslow.
Palmer, William Richard .....Priddy.
Parker, George Brook . .....Bradford.
Parker, Thomas .....High Coniscliffe.
Payne, Hiram .....Brynhyfryd.
Peck, Thomas Whitmore .....Birmingham.
Pereira, Frederick Arthur .....London.
Portlock, Frederick.....Wotton-under-Edge.
Pring, Charles Herbert .....Bristol.
Ramshaw, Harold .....Sunderland.
Rees, Alcwyn .....Daventry.
Reid, Richard .....Leith.
Rennie, John .....Carluke.
Richardson, Samuel John .....West Brighton.
Roadknight, Chas. Herbert W.Atherstone.
Roberts, Robert .....Llanfachraeth.
Roberts, William Griffith .....Llanfairfechan.
Robertson, David Stewart .....Rutherglen.
Robinson, William Percy .....Preston.
Robson, Wm. Robt. Longstaff..Choppington.
Rothwell, William .....Wigan.
Rutherford, Thomas .....Coldstream.
Samuel, Alfred Edward ....Swansea.
Sands, John Harold.....Colchester.
Saunders, Lancelot Foster.....Totnes.
Scott, Govan Henry .....Renhold.
Scrivener, Alfred Robert .....Witham.
Scroggie, John Henderson .....Auchmill.
Seatter, William .....Edinburgh.
Settle, Victor Alfred ... .Coventry.
Shearer, George ....Edinburgh.
Shelley, Philip .....Coggeshall.
Shennan, Robert James .....Castle Douglas.
Simpson, Austin Johnson .....Castleton.
Simpson, John Edgar .....Palgrave.
Simpson, Robert .....Aberdeen.
Smail, James Cuthbert .....Perth.
Smales, Ernest Emanuel.....York.
Smart, Gordon .....Huntly.
Smart, Robert Aubrey .....Cranborne.
Smith, Harrington Wm. Edwd.Wotton-under-Edge.
Smith, William Urton.....Edinburgh.
Snape, Geo. Herbert B. .....Birmingham.
Softly, Alfred Ernest .....London.
Staton, John..... .....Durham.
Staward, Richard.....Berwick-on-Tweed.
Stelfox, Walter Edmund.....Northwich.
Stewart, Wm. N.....Glasgow.
Stone, George Percival R. .....Norwich.
Sutherland, John Geo.....Sunderland.
Thomas, Abraham Lewis .....Llanarth.
Thompson, Edward John .....Bournemouth.
Thompson, Thos. Richd. ArundelElgin.
Tipper, Ernest Harry .....Clevedon.
Tomkys, Leonard Sydney .....Walsall.
Tootill, Robert Harrison.....Bury.
Trethewey, John Henry.....Chesterfield.
Tucker, John .....Mumbles.
Turner, Arthur Charles .....Cheltenham.
Tyrer, Charles Thomas .....London.
Uren, Ernest Frederick .....Hayle.
Wade, Thomas.....Oldham.
Wathes, Charles John .....Leicester.
Waymouth, Ernest Albert.....St. Mary Church.
Wells, Louis John .....Shipley.
Westlake, George Frederick ...London.
Weston, Chennell.....Hastings.
White, John Alexander .....Morebattle.
White, William Henry .....Bolton.
Whitelock, Henry Winstanley..Hastings.
Wild, Thomas William .....Leicester.
Wilkinson, Henry Albert .....Bulwell.
Wilkinson, William George ...Keighley.
Williams, John Daniel Evans...Cardigan.
Williams, William Owen .....Bangor.
Williams, William Robert .....Bangor.
Wilson, Henry Goodwin.....Aberdeen.
Wise, William .....Framlingham.
Wood, Alfred Hazard.....East Cowes.
Wood, Willie.....Stanningley.
Woodcock, Edgar A. Addis ...Margate.
Woods, Joseph Francis .....Liverpool.
Worth, Wallace .....Bristol.
Wright, Harry Joseph .....Kirby Moorside.

The questions set for this examination were printed before, p. 62.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	15	11	4	Inverness	6	5	1
Birmingham	19	11	8	Lancaster	6	4	2
Brighton	7	6	1	Leeds	20	9	11
Bristol	13	8	5	Lincoln	9	1	8
Cambridge	2	1	1	Liverpool	16	5	11
Canterbury	7	5	2	London	39	22	17
Cardiff	2	1	1	Manchester	28	14	14
Carlisle	8	4	4	Newcastle	16	8	8
Carmarthen	14	9	5	Northampton	4	1	3
Carnarvon	7	4	3	Norwich	6	5	1
Cheltenham	2	1	1	Nottingham	9	4	5
Darlington	4	2	2	Oxford	5	4	1
Douglas	1	1	0	Peterborough	3	1	2
Dundee	7	1	6	Sheffield	10	4	6
Edinburgh	26	16	10	Shrewsbury	3	2	1
Exeter	7	3	4	Southampton	11	7	4
Glasgow	14	5	9	Truro	3	2	1
Guernsey	1	1	0	Worcester	4	0	4
Hull	6	2	4	York	10	6	4

NORTH BRITISH BRANCH.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, July 27, at 4 p.m.

Present—Messrs. Ainslie, Baildon, Boa, Clark and Stephenson, Edinburgh, and Messrs. Gibson, Leven; Kermath, St. Andrew's; Kinninmont, Glasgow; Maben, Hawick; Nesbit, Portobello; Strachan, Aberdeen; and Watt, Haddington.

Apologies for absence were received from Messrs. Gilmour and Mackay, Edinburgh; Frazer, Glasgow; Hardie, Dundee; Paterson, Aberdeen; and Storrar, Kirkcaldy.

The chair was taken by Mr. Baildon.

The minutes of the last meeting were read and approved.

The Chairman then stated that the first business was the election of a Chairman of the Executive for the year 1887–88, and Mr. Nesbit, Portobello, moved that Mr. Baildon should be re-elected.

This was seconded by Mr. Kinninmont, Glasgow, and carried unanimously.

On the motion of the Chairman, seconded by Mr. Kermath, St. Andrew's, Mr. Watt, Haddington, was unanimously re-elected Vice-Chairman.

The resident members of Executive were appointed a Local Purposes Committee to deal with business arising in the interval between meetings of the Executive.

On the motion of the Chairman, seconded by the Vice-Chairman, consideration of the resolution passed at the meeting of Scotch members and associates in business on July 13, relative to publishing a general report of the Executive meetings, was delayed till next meeting of the Executive.

SPECIAL DECENNIAL APPEAL IN AID OF THE BENEVOLENT FUND.

The following donations and new annual subscriptions have been received since the publication of the list in the *Pharmaceutical Journal* of May 21st last.

	Donations. £	s.	d.	Annual Subscript. £	s.	d.
A Friend	1	1	0	..		
Allen, Stafford and Sons, 7, Cowper St., E.C.	5	5	0	..		
Atkinson, J. G., 196, Belsize Road, Kilburn	..			0	16	0
Barron, Harveys and Co., Giltspur St., E.C.	10	10	0	..		
Bateman, T. H., 342, High Road, Kilburn	1	1	0	1	1	0
Bevan, W., 8, Brondesbury Terrace, Kilburn	..			0	5	0
Blackman, T., 18, Broad St., South Molton	0	5	0	..		
Bowen, John T., 238, Belsize Road, Kilburn	..			0	10	6
Brightmore, Walter, 237, Maida Vale, W. ..	..			0	10	6
Burgoyne, Burbidges, Cyriax and Farries, 16, Coleman St., E.C.	10	10	0	..		
Cosway, E.C, 109, High Road, Kilburn, N.W.	..			0	10	6
Croyden, Charles, 45, Wigmore St., W. ..	5	5	0	..		
Dunlop, Thomas, Pollokshields, Glasgow ..	..			0	5	6
Edwards, Wm. and Son, 157, Q. Victoria St.	10	10	0	..		
Elliot, Wm. Marshall, 17, Square, Kelso ..	..			0	5	0
Evans, Gwilym, 7, Stepney Street, Llanelly	0	10	6	..		
Evans, Sons, and Co., 56, Hanover St., Liverpool	100	0	0	..		
Hall, Samuel, Church St., Littleborough ..	..			0	5	0
Holt, John, 83, Clowes St., Hyde Rd., West Gorton, Manchester..	..			0	5	0
Horner and Sons, Mitre Square, Aldgate, E.	10	0	0	..		
Howard, D., Rectory Manor, Walthamstow	2	2	0	..		
Howard, W. D,, City Mills, Stratford, E. ..	5	5	0	..		
Hucklebridge. P. and W., 116, Ebury Street, Pimlico, S.W.	..			1	1	0
Huskisson, H. O., 77, Swinton St., W.C. ..	..			2	2	0
Merck, Emanuel, Darmstadt	5	5	0	..		
Moss, John, and Co., Wilson St., New Cross Road, S.E.	5	5	0	..		
Morgan, H. B., 27, Prince Alfred Road, Wavertree, Liverpool	0	2	6	..		
Norburn, A. H., 26, Cazenove Road, Stamford Hill	1	1	0	..		
Nuthall and Mason, Bank Plain, Norwich..	2	2	0	..		
Peacock, George, 80, Cambridge Road South, Kilburn, N.W.	..			0	2	6
Penny, John, Great Broughton, Carlisle ..	0	10	6	..		
Probyn, Clifford, 7, Pall Mall East, S.W. ..	10	10	0	..		
Rayson, John T., 273, Alfred St. Central, Nottingham	0	10	0	..		
Rutter, John 109, High Road, Kilburn, N.W.	..			0	5	0
Sanger, John and Sons, 489, Oxford St., W.	..			2	2	0
Southall, Bros., and Barclay, 17, Bull Street, Birmingham	10	10	0	..		
Warren, George R., 79, Abbey Road, St. John's Wood, N.W.	..			0	10	6
West, Thomas, 61, Chester Road, Stretford, Manchester..	0	5	0	..		
Weston, S. J., 151, Westbourne Terrace, W.	1	1	0	..		
Wilkinson, Wm., Cheetham Hill, Manchester	1	1	0	..		
Willows, Jesse, 101, High Holborn, W.C. ..	3	3	0	..		

Parliamentary and Law Proceedings.

The Leith Depôt Case under the Pharmacy Act.

The following are the arguments addressed to the High Court of Justiciary by counsel on the hearing of the appeal of Gray and Others *v.* Bremridge. The appellants were convicted in June last by Sheriff-Substitute Rutherfurd, at Edinburgh, of an offence under the Pharmacy Act of 1868, and they now sought to have that conviction quashed.

The Dean of Faculty, Q.C., and Mr. Orr, appeared as counsel for the appellants. Mr. Graham Murray and Mr. Shaw appeared as counsel for the respondent.

Dean of Faculty: My Lord, I attend your Lordships in this case for the appellants, being the whole shareholders of a certain limited company known as the Leith Depôt, Limited, who have been convicted by the Sheriff-Substitute of Midlothian, of an offence under the Pharmacy Act of 1868. The offence is the first charged in the complaint. The remaining offences are offences with which your Lordships need not trouble yourselves under this appeal. The offence charged under the first head of the complaint is in substance this, that the company, of which these persons are shareholders, advertised itself by a signboard and by placards and circulars, as carrying on the business of chemists and druggists, and that thereby the shareholders of the company incurred penalties prescribed by the Pharmacy Act of 1868, against persons who hold themselves out as chemists and druggists without having passed certain examinations and become members of a certain learned society which the Act of 1868 recognized, namely, the Pharmaceutical Society. I am going to submit to your Lordships that the decision of the Sheriff is not only wrong in itself, but is in direct conflict with a judgment of the House of Lords in a similar case, which was some time ago tried in England, and which it had been supposed had settled the law, to the effect that the Pharmacy Act of 1868 did not apply to corporations, provided the corporations conducted their business of chemists and druggists by means of duly qualified agents. Now, my Lords, the facts of the case are very short, and it is convenient to take the case upon the facts. They come to this that there was and is a company which deals in a variety of things, groceries of all descriptions, and also drugs. They call themselves wholesale and retail grocers and wholesale and retail druggists. They have above their door the name, "The Leith Depôt, Limited." They are a corporation beyond all doubt, validly incorporated under the Act of 1862, and consist of seven persons, some of them having a large number of shares, others a smaller number, and some having a very small number.

Lord Young: It would be the same as if it was a private company carrying on business under the name of Duncan and Flockhart.

Dean of Faculty: I doubt whether a private company is quite in the same position.

Lord Young: I really meant the observation for you, I see no distinction.

Dean of Faculty: Quite so. I confess I am prepared, if the question should arise, to maintain that a private partnership in Scotland at all events by courtesy is a separate person.

Lord Young: By law. Duncan and Flockhart may consist of partners who may be women and children at this moment.

Dean of Faculty: In England there might be some difficulty as to whether a firm, not a corporation, was anything else than a congeries of persons who were carrying on a joint trade.

Lord Justice Clerk: A limited partnership.

Dean of Faculty: That would raise very much the same question.

Lord Young: You can hardly examine a limited company.

Dean of Faculty: It is not a natural person, and it could hardly be a member of the Pharmaceutical Society. It cannot dispense drugs, or sell or compound medicines by itself; it can only do so by means of duly qualified agents. We contend that upon a just construction of the Pharmacy Acts it is enough that this company does in fact dispense drugs by agents who have the qualifications provided by the Act.

Lord Young: The question appears to be whether a company can sell drugs unless the partners thereof are qualified chemists.

Dean of Faculty: That appears to be so. I think that the argument on the other side really comes to this.

Lord Justice Clerk: Or whether a person can belong to a company doing that unless he is himself qualified.

Dean of Faculty: Yes. A question has arisen whether, even if all the partners of a limited company were as individuals qualified persons, that would entitle the company to carry on business and advertise itself as chemists and druggists, inasmuch as the Act being directed against all persons, may, in the absence of decision, have been held to have struck at the carrying on of such a business by a corporation.

Lord Young: A corporation would require to attend lectures and submit to examination.

Dean of Faculty: The facts here are as I have stated. This corporation carried on business. It might have consisted of a thousand persons all over the country.

Lord Justice Clerk: Does the company carry on business by means of qualified agents?

Dean of Faculty: The shop at 49, Leith Walk was under the management of the appellant, Mr. Andrew W. Gray, one of the shareholders, and an assistant, Mr. Nicholas Dodds, who is a duly qualified chemist and druggist. The shop at No. 33, Ferry Road, was managed by an assistant, Mr. Henry Forwell, who is a duly qualified chemist and druggist. I entirely reserve the question, which does not arise here, whether Mr. Gray, an individual shareholder, who is said to manage one of the shops, may not be himself liable to a penalty in respect of his actually, as an agent of the company, selling and dispensing medicines without a qualification: that point is not raised here at all. The question is as to the shareholders as a body. Now, my Lord, these being the facts, the Pharmacy Act of 1868 is an Act which was passed——

Lord Young: Do you admit that if anybody not qualified compounded or dispensed drugs he would be liable?

Dean of Faculty: Yes. The Act only strikes at natural persons.

Lord Young: Examinable persons.

Dean of Faculty: Yes. It shall be no offence if the person who keeps open shop and sells medicines does so by means of an agent who has the requisite qualification.

Lord Justice Clerk: It is said at the bottom of p. 4 that the shop at 49, Leith Walk, was under the management of the appellant, Mr. Andrew W. Gray, one of the shareholders, and an assistant who is duly qualified; but then Mr. Gray is not qualified.

Dean of Faculty: Mr. Gray managed the shop, but this business only partly consists of the sale of drugs. It is like a co-operative society.

Lord Justice Clerk: It is too wide. It should have said that Mr. Gray does not dispense, although he manages.

Dean of Faculty: They do not charge Mr. Gray as separately liable in respect of his having sold.

Lord Justice Clerk: I mean that the statement of facts bears that Mr. Gray manages that shop along with their dispensing business, and that it is also found as a matter of fact that none of the appellants are themselves qualified. There should have been a statement as to what share he took in the management.

Dean of Faculty: No doubt it is not an accurate statement that your Lordship refers to, but I daresay it will not be disputed that Mr. Gray manages the grocery business, and a qualified assistant has charge of the drug business.

Lord Young: It would be quite allowable for him to look after those engaged in the drug business, if he did not meddle with the drugs himself.

Lord Justice Clerk: We assume it to be admitted that he did not.

Dean of Faculty: There is no doubt of that. There is no case of sale made in the complaint so far as the complaint is found proved.

Lord Young: It struck me on reading the complaint that there is no statement that Mr. Gray or anybody else is not qualified according to the statute. If it does it did not catch my eye, and I looked twice over for it.

Dean of Faculty: Your Lordship is quite right; it is not so stated in the case.

Lord Young: I am referring to the complaint. Does it charge these people with not being qualified in terms of the Act?

Dean of Faculty: It does, I understand. At p. 8, between E and F, there occur the words "none of the said Andrew W. Gray," and so on "being a duly registered pharmaceutical chemist, or a chemist and druggist, within the meaning of the said recited Act."

Lord Young: That supplies what I desiderated.

Dean of Faculty: The part of the complaint now in question charges the shareholders of the company not with selling or dispensing and so on, but with advertising themselves and calling themselves chemists and druggists. That is the offence of which the shareholders have been convicted. There are separate charges against Mr. Gray as an individual of having violated the Act by calling himself a chemist and druggist, in so far as he signed the memorandum and articles of association, putting the name "chemist and druggist" after his name, and describing himself in that character; but these charges are departed from or found not relevant in respect that the complaint was not made within six months. There are also complaints, and it is not unimportant to notice this fact, against the two assistants in the shop who are not qualified, or were said not to be qualified, for having sold medicines as assistants without having the necessary qualification. One of these assistants was found not guilty, and the other was found guilty. The charges against these assistants are not before your Lordships, but they are important as showing that agents of the company——

Lord Justice Clerk: Have we any copy of these advertisements anywhere?

Dean of Faculty: No, I think you have just a recital of them, to the effect that they put up above the door of their shop the sign, "The Leith Depôt, Limited."

Lord Justice Clerk: We may assume that the company is designed as chemists and druggists.

Dean of Faculty: As wholesale and retail grocers and wholesale and retail chemists and druggists, and that in their circulars and advertisements they so describe themselves. On p. 4 of the case it is stated that "the title exhibited above both shops is, 'The Leith Depôt, Limited, Wholesale Chemists, Druggists and Tea Merchants,' and also that all circulars, labels and advertisements bore the words 'The Leith Depôt, Limited, Wholesale Chemists, Druggists and Tea Merchants,'" and that is the thing complained of. Now, my Lord, what I maintain is that the Pharmacy Act does not affect corporations at all, that it only strikes at natural persons, but that, according to the true construction of the Act, a natural person without a qualification, selling or acting otherwise in contravention of the prohibitions of the Act shall not be entitled to defend himself on the ground that he is an agent and not a principal—that he has a master behind him, either in the person of a limited company or of any natural person. The Act is an Act passed in 1868, the preamble of which is to the effect that whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing or compounding of poisons, and persons known as chemists and druggists should possess a competent practical knowledge of their business, and from a certain date, any persons not already qualified were to be examined, and if found qualified were to be registered. It was therefore enacted first of all by way of prohibition that from and after December 31, 1868, it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons; or (second) to assume or use the title chemist and druggist or any similar title, unless such person shall be a pharmaceutical chemist or a chemist and druggist within the meaning of the Act, and be registered under the Act, conform to such regulations, etc., as may from time to time be prescribed by the Pharmaceutical Society. Now, these are the prohibitions of the Act. Various other clauses of the Act are of importance as illustrating the meaning of these prohibitions. I pass in the meantime to the 15th section, which is the section that enacts the penalties. From and after the day in question any person who shall sell or keep open shop for retailing, dispensing or compounding poisons—that is the first offence, or who who shall take or use the name or title of chemist or druggist—that is the second offence, and the one which I am charged with here. The third offence is failure

to conform to any regulation by the Pharmaceutical Society.

Lord Young: The 15th section is just imposing penalties for transgressing the 1st section.

Dean of Faculty: And one other offence, the fourth, "or who shall compound any medicines of the British Pharmacopœia, except according to the formulæ of the Pharmacopœia," shall for every such offence be liable in a certain sum. That last penalty for compounding medicines otherwise than according to the Pharmacopœia was very much canvassed in the case I am going to refer to as illustrating the meaning of the Act, and as showing that what the Act struck at was the actual dispenser or compounder of the medicine.

Lord Justice Clerk: Is not that offence set forth in the 1st section?

Dean of Faculty: No; it does not mention it.

Lord Justice Clerk: The offence is selling or keeping open shop for the purpose of sale.

Dean of Faculty: Yes; and using the name. The 1st and 15th sections are the most important, with the exception of another section, which provides that if a qualified chemist carrying on business dies, his executors shall, without being themselves qualified, be entitled to carry on the business in their proper names without being liable to the penalty, if only they have a qualified assistant. Well, the question came up, and it is a very large and important question, in England in 1878.

Lord Young: I see Lord Watson is not very complimentary to the statute. He says it is characterized by a great ambiguity, and he would also go the length of saying, confusion of language.

Dean of Faculty: He points out, what is very true, that the statute set out two objects quite distinct, the one enlarging the privileges of this learned body, and the other being the protection of the public.

Lord Young: They want to keep up the prices of drugs.

Dean of Faculty: It is directed against incompetent persons dispensing poisons. The Act is 31 and 32 Vict., c. 121. The question first arose with a limited company like this, consisting like this of seven persons—one of these persons who had only a nominal share being qualified, and taking part in the management. A complaint was brought in the magistrate's court, and the magistrate acquitted, on the ground, apparently, that the statute did not apply to limited companies—to corporations. In the Court of Queen's Bench, the Lord Chief Justice Cockburn and the other learned Lords held that the statute was intended to prevent corporations from carrying on businesses of this description, that the statute desired to secure that the proprietor of every business should be a person capable of examination and capable of being registered, and that therefore it prohibited the carrying on of a business of this kind by any person or corporation.

Lord Justice Clerk: Not looking to the personal qualification on the part of whoever carried it on.

Dean of Faculty: It was the proprietor of the business, it not being enough that the actual agent of the corporation should have been qualified. The point which appeared to them to be involved, was that in order to prevent the mischief struck at, it was necessary—

Lord Justice Clerk: That the man who keeps open shop should be personally qualified.

Dean of Faculty: And that if corporations were in the position of being incapable of being personally qualified, so much the worse for corporations. In that view the Act did not contemplate or desire that corporations who could not be qualified but who were yet proprietors should have the right to carry on such a business. Undoubtedly their Lordships in that case carried the doctrine to its full and logical conclusion, namely, that it did not matter in the least, the company not being qualified, what the shareholders were,—whether they were qualified or not, many or few—whether they were all qualified or only some,—the view being that a corporation being a separate person from the shareholders, you had nothing to do with the shareholders, and that the company being a person struck at by the Act, and the business belonging to the company, a penalty was incurred by the company as having kept open shop and carried on business by their agents. Lord Chief Justice Cockburn, in a judgment which is entitled to all the respect which attaches to any judgment of his, held that the term "person" in law was one which was capable of including artificial persons.

Lord Young: That judgment was reversed in the Court of Appeal by Lord Bramwell, Lord Justice Baggallay and Lord Justice Thesiger, and their judgment was affirmed by the House of Lords.

Dean of Faculty: The view of the Lord Chief Justice and Lord Justice Mellor was that the term "person" included corporations, and that it was the policy of the Act to prevent corporations carrying on businesses of this kind, corporations being proprietors of businesses.

Lord Young: And they could not be qualified as the law requires.

Dean of Faculty: Yes; the case went to the Appeal Court and then to the Court of Appeal, and the report there will be found in 5 Queen's Bench Division, 310. The rubric is to the effect that in sections 1 and 15 of the Pharmacy Act of 1868, which prescribe the liability to a penalty of any person not duly qualified and registered as a pharmaceutical chemist or a chemist and druggist, the word "person" does not include a corporation, and that the penalty cannot be recovered from an incorporated company keeping a chemist's shop, as set forth in the Act. In that case, observe, the complaint was directed, as I think it ought to have been here, against the company. My argument is, that what is here charged was a legal act on the part of the company. If the act was lawful on the part of the company, the shareholders can never be liable in a penalty in respect of a lawful act performed by the company of which they are shareholders.

Lord Young: It was lawful or not, just as they employed properly qualified persons to conduct this part of the business.

Dean of Faculty: I do not know that I require to read the judgments in the Court of Appeal.

Lord Young: The contest, I suppose, is really between the established chemists, who want to keep up the prices, and the joint stock companies and stores, who want to bring them down.

Dean of Faculty: The prosecution is at the instance of a public officer, and alleged to be for the public interest. Undoubtedly the result of the Sheriff's judgment would be to put down a department of trade at present extensively carried on by co-operative stores and limited companies in all large towns. Lord Justice Bramwell first deals with this question, whether, supposing the company had committed a breach of the Act, the company might be sued as being liable to a *quasi* criminal prosecution. He held that if the company was struck at by the Act, a penalty might be imposed, notwithstanding that they were a mere abstraction.

Lord Young: And what is more important, we decided that that was so.

Dean of Faculty: I suppose it has been decided more than once in Scotland.

Lord Young: We decided it very recently.

Dean of Faculty: His Lordship proceeds to consider the question—Was it lawful for a limited company to advertise itself and to keep open shop and to sell by means of a qualified assistant? And he examines the various sections of the Act where the term "person" occurs, and he comes to the conclusion that it is impossible to read the Act upon the footing of the term "person" including corporations, and very much for the reasons already indicated, that a corporation cannot be examined or registered, and so on. He then goes on to inquire whether, although the term "person" was not, therefore, to be presumed to include corporations, the

obvious policy and intention of the Act required that the term person should be stretched so as to include corporations; and he comes to this conclusion that the Act would not by any means be a dead letter, even upon the respondent's view; that the Act, while allowing corporations to carry on business as before, did yet strike at the carrying on of a business by anybody otherwise than through qualified agents; that, in short, the actual dispenser or seller of the medicine, the actual compounder, was under the Act always liable to the penalties of the Act if he was not qualified, and that, moreover, a corporation employing a person not qualified to sell or to dispense or to compound, was liable as being art and part in that agent's default. But his Lordship came without difficulty to the conclusion that no complaint would lie against the company on the footing of the company being a person, his view being that it was enough that the company carried on its business by a qualified representative. It so happened that the person in charge of the shop was a shareholder, although only to a nominal extent.

Lord Justice Clerk: But supposing he was not a qualified person, you could not put the Act in force against the corporation, but only against the person who was employed by them, not being qualified.

Dean of Faculty: Suppose a corporation employed unqualified persons to sell poisons or dispense poisons, the persons so employed would be liable under the Act; but it is pointed out in these opinions, and I think it fairly follows that the corporation might also be liable as being art and part in the act of the person whom they had employed to do the thing.

Lord Justice Clerk: The words of the statute do not include them.

Dean of Faculty: It would be only as a matter of construction that that result would be reached, but that is a question which would probably be solved in the way I have mentioned.

Lord Justice Clerk: The offence is keeping open shop. The man who dispenses is a mere servant, and is not the man who keeps open shop. The corporation would not be liable for that offence of the servant.

Lord Young: If it was illegal for the corporation to sell drugs except through a qualified person, they could be restrained from doing it.

Dean of Faculty: Fortunately that question does not arise here. There is no suggestion that this company carries on its business otherwise than in the best manner it can; it complies with the statute, in so far as it is possible for a company of that sort to do so. It is right to say that, in giving judgment, concurring with the other judges, Lord Justice Thesiger made an observation which seems to have suggested the present prosecution. He says in the course of his opinion, "I do not think that under such circumstances the Court ought to strain the language of the Act so as to make it include corporations, even if it were clear that the mischief intended to be provided against would not otherwise be remedied. But I feel bound to add I am by no means satisfied that, although a corporation as a separate entity be not liable to the penalty which is sought to be recovered in the case, the individual members of the corporation, whether directors of the company or otherwise, may not be liable, and thus the mischief be remedied. I prefer, however, to give no definite opinion upon this point." The Lord Chancellor goes upon this that prior to the Act corporations might lawfully carry on this business, and that the Act did not touch them.

Lord Justice Clerk: That they may keep open shop for the purpose of dispensing drugs although they are not qualified.

Dean of Faculty: Yes, provided that the person whom they employ to do so is qualified. Keeping open shop is only prohibited incidentally.

Lord Young: Take the case of Mr. White, who sells chemicals.

Dean of Faculty: He does not call himself "White, Chemist."

Lord Young: He ought to do so, for he sells chemicals in his shop. I do not know whether he calls himself an undertaker, but he sells coffins, and will sell you a grave.

Dean of Faculty: There is nothing in Lord Justice Bramwell's opinion to the effect that the Legislature intended indirectly to prohibit the carrying on of such trade corporations,—I mean making the penalty applicable to partners. All difficulty in regard to such matters I think disappears when the case comes up to the House of Lords, where Lord Chancellor Selborne, Lord Blackburn and Lord Watson pronounced a unanimous judgment, the rubric of which I think correctly enough sets forth the result,—under these circumstances that the word "person" in the 1st and 15th sections did not apply so as to make an incorporated company liable to the penalty, but the actual seller must be a qualified person.

Lord Young: That means that the corporation may carry on the business provided that the actual seller is qualified; in short, that they conduct that part of the business by qualified men.

Dean of Faculty: The situation of the corporation as such is just as if the Act had not been passed.

Lord Justice Clerk: That is what it comes to.

Dean of Faculty: But those agents who take charge of their business must be qualified, or if not qualified they will incur penalties.

Lord Justice Clerk: There is nothing about the person who actually dispenses as being the servant of another.

Dean of Faculty: The construction put upon the Act is this, that the Act draws no distinction between persons who dispense or sell as principals, and persons who dispense or sell as agents.

Lord Justice Clerk: It is plain that the Act is directed against principals. It is keeping open shop or selling. The principal is the seller, and the servant is only the hand.

Dean of Faculty: The Act strikes at actual persons.

Lord Justice Clerk: I think the Act is broad enough to include the man who actually hands the article over the counter, who is not qualified.

Dean of Faculty: The man who is over him, and is actually in charge of the business may very well also be held to sell or keep open shop, or to compound the medicine which the unqualified lad compounds under his eyes.

Lord Young: You must try to make practical sense of what Lord Watson calls very inaccurate and confused language.

Dean of Faculty: The difficulty which your Lordship in the chair mentioned was a difficulty which weighed with Chief Justice Cockburn. The House of Lords held that that difficulty must be overcome by reasonable construction, and that it did not matter whether the seller, dispenser or compounder was the principal or the agent, the servant or the master; the purpose of the Act was served by striking at the actual seller, compounder or dispenser, and if that person was a natural person, the purpose of the Act was sufficiently served. Now, the Lord Chancellor, Lord Selborne, first of all deals with the question of the meaning of the word "person" in such Acts, and points out that the word "person" may include corporations or not, according to the context. He proceeds to deal with what is called the main argument of the appellants that the Act will fail in its purpose unless corporations as well as individuals can be included. He holds that the Acts mentioned in the first section, and in the sections by which penalties are imposed, are struck at whether the person doing them is the principal to whom the business belongs, or one whom he employs to carry on the business.

Lord Young: He holds that he need not be the principal.

Dean of Faculty: Yes, and therefore that the mischief which the Act was intended to guard against or to

remedy, namely, danger to the public, was sufficiently prevented by the provisions of the Act, on the construction which their Lordships adopted, and which I now ask your Lordships to adopt.

Lord Justice Clerk: I wish to point out that in the Act it is provided that any person who at the time of the passing of the Act shall be of full age and gets a certificate that he has been for a period of not less than three years actually engaged in the dispensing and compounding of prescriptions, is entitled to be registered as a chemist and druggist. But is he entitled to dispense prescriptions before he is registered?

Dean of Faculty: No, I rather think not.

Lord Justice Clerk: But that is the qualification for being registered.

Dean of Faculty: It illustrates Lord Watson's observation very forcibly. The theory was that the three years passed before the Act passed.

Lord Justice Clerk: So it was quite lawful before that, and there was a qualification for being registered.

Dean of Faculty: The Act gives certain facilities for such people becoming registered. Any person who, prior to the passing of the Act, had been in business was entitled to be registered.

Lord Justice Clerk: They might poison the lieges before.

Lord Young: They may even continue unregistered.

Lord Craighill: Is there any limit on the length of time the executor of a deceased qualified chemist, who has been carrying on business, may carry it on?

Dean of Faculty: Section 16 provides for that—nothing hereinbefore contained shall extend to, or interfere with the business of any duly qualified chemist, or any pharmaceutical chemist actually in business at the time of his death. It shall be lawful to continue such business if, and so long only as the business shall be *bonâ fide* conducted by a duly qualified assistant.

Lord Craighill: He may be brought in for the mere purpose of carrying on the business, in so far as the compounding of medicine is concerned; he may be a man employed for the first time for the very purpose of enabling them to carry on the business.

Lord Young: The preamble of the Act is whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing or compounding of poisons, and persons known as chemists and druggists, should possess a competent practical knowlege of their business, and to that end, that from and after a day named, all persons not already engaged in such business, should, before commencing such business, be duly examined as to their practical knowledge; the narrative at least excludes people who are already engaged in the business, and says, "we do not mean to interfere with you: just go on."

Lord Justice Clerk: Surely the Act does interfere with them by making certain requirements.

Mr. Murray: If you have been at the business for three years, you are registered, under section 4.

Dean of Faculty: Any person in business at the passing of the Act has his vested right so far respected that he has an easy door open to him to qualify under the Act. Any person who begins after the passing of the Act must pass an examination and must enter by a much narrower door.

Lord Justice Clerk: Your general view is that the persons against whom the provisions of the statute are directed in this case have not committed the offence because they are duly qualified persons, namely, by their assistants.

Dean of Faculty: That the company was doing a lawful act in doing the thing complained of, and that, therefore, the shareholders cannot be criminally responsible for the lawful act of their company.

Lord Young: If the prosecutor's view is well founded and be sustained, he must have his penalty against each member of the corporation, although it should be proved that no drugs were ever compounded or sold or meddled with, except by duly qualified chemists, in their premises.

Dean of Faculty: Yes. My friend's case seems to go to this, that, although a corporation may carry on its business lawfully, yet every member of the corporation is liable to be prosecuted for a thing lawfully done by the corporation. I do not know that it would make any difference whether the members of the corporation were qualified or not, if the corporation was entitled to do the thing. If the corporation was not entitled, no amount of qualification on the part of the individual shareholders could mend the flaw in the position of the limited company.

Lord Craighill: What is the precise amount of liability, if the Act does not apply to the corporation itself? How are the partners reached?

Dean of Faculty: That is the difficulty which I have in understanding the Sheriff's judgment.

Lord Craighill: The thing is done by a particular individual; the compounding is done by a qualified person.

Dean of Faculty: I shall tell your Lordships what I think was in the Sheriff-Substitute's mind. Suppose the corporation had been struck at, but there was no means of reaching the corporation by a *quasi* criminal proceeding, it might very well have been possible in such a case to bring a criminal proceeding as against the shareholders of the corporation as having by their memorandum and articles of association sanctioned the unlawful act which the corporation had performed, and so made themselves art and part in the unlawful act of the corporation. The Sheriff-Substitute seems to consider that the judgment in the case in the House of Lords merely went this length, that where one of the members was a qualified person the corporation escaped.

Lord Justice Clerk: Take the case away from a corporation to a trustee carrying on a lucrative business of this kind for the benefit of the representatives of a deceased person. He employs skilled assistants quite qualified to carry it on, but he knows nothing about it himself. How would the Act apply in that case?

Dean of Faculty: For the case of a trustee of a deceased person there is a special provision in the Act. In the case of a trustee, say in bankruptcy, a question of some delicacy would arise as to whether that person was not keeping open shop, and was not as an individual struck at by the prohibitions of the Act. I do not know how that would be. It is a question I do not think yet solved, but it may very well arise. The Act does not strike at corporations. A person may keep open shop by the hand of another, although he does not himself dispense.

Lord Justice Clerk: That is to say he is prohibited from calling in any person who is not qualified.

Dean of Faculty: Yes. The Lord Chancellor deals with the point your Lordship put about keeping open shop. He says that no doubt the words "Keep open shop" may extend to something more, and comprehend a person who keeps open shop for the sale of poisons, although he may not with his own hand sell the poisons. He then proceeds to deal with the case of corporations keeping open shop for retailing poisons.

Lord Young: If his Lordship's view is sound, it is completely adverse to Lord Justice Thesiger's suggestion.

Dean of Faculty: Yes.

Lord Justice Clerk: If an individual keeping open shop employs a qualified man to do the work in the shop, it would follow from what his Lordship states, that that would relieve him from the penalties.

Dean of Faculty: I think that is his Lordship's opinion, but he leaves open the question whether——

Lord Young: The whole sense of the Act necessarily leads to that.

Dean of Faculty: I rather think it does.

Lord Justice Clerk: It would be a strong view of the construction of the Act to say that that would be lawful

when done by a corporation but not lawful when done by an individual.

Dean of Faculty: The only reason for the distinction would be that the Legislature had thought fit to prohibit it in the case of individuals, but had omitted to prohibit it in the case of corporations. It may very well be that that is the view, but, again, it may very well be what your Lordship has said, and I think it was probably the view of the Lord Chancellor, that in the case of a individual keeping open shop, it did not matter whether that individual was or was not qualified, if the selling and dispensing were conducted by duly qualified assistants, keeping open shop being merely prohibited as incidental to the selling or dispensing or compounding.

Lord Young: What would the view be if all the members of the partnership but one were duly qualified? They would be prosecutable according to this view. If a deceased partner of Duncan and Flockhart gave his shares in the business to his widow, she would be liable to the penalties, or must get out.

Dean of Faculty: Yes, supposing Duncan and Flockhart were a limited company.

Lord Young: Suppose it to be exactly as it is. Take the case of a private company of wine merchants selling wine and not drugs; it is a mere name. If these were chemists, must all the partners, however numerous, be qualified chemists, although every one who sells drugs in the shop is qualified?

Dean of Faculty: It must always be assumed that none of the partners take part in the business, but if any partner keeps the shop, superintends the business or takes any responsibility in connection with it he shall be qualified, and if not qualified he shall be subject to the penalty.

Lord Young: Take the case of a wife who is a partner, and who sends her husband, who is not, but who is a qualified chemist, to conduct the business.

Lord Justice Clerk: It is not expressed at whose instance the shop is kept open, but it is the man who actually dispenses that is in view.

Dean of Faculty: My argument is that we are not here dealing with individuals keeping open shop, and it is only individuals keeping open shop who are struck at. The Court of Queen's Bench held that the Legislature intended to prevent anybody being proprietor of a drug business who was not a qualified person, that they did not merely require that the actual management should be in the hands of qualified persons, but that every person who had a title to interfere with the management, every person having a title of property in the business must be a qualified person; and I think they went the length of holding that it did not matter in the least what were the company's qualifications, the company not being capable of being qualified under the Act. Their judgment was reversed. Without detaining your Lordships further I would just mention that Lord Blackburn took entirely the same view as the Lord Chancellor, and Lord Watson agreed. I reach this proposition, that the thing done there was a thing done by the company, and the thing done here is a thing done by a company. It was held that the thing done there was a lawful act, and was not affected by the Act of Parliament at all. The thing done here, by parity of reasoning, is a lawful act, is a thing which the company are as much entitled to do now as before the Act was passed. The thing charged being a lawful act, how shall the individual members of the company be responsible for penalties in respect of that lawful act on the part of the company? I venture to think that the Sheriff-Substitute has misread the opinions in the Appeal Court and the House of Lords, where he puts it that they merely proceded upon the special circumstances of that case, and in particular upon the fact that was never mentioned as a fact of any moment, that one of the seven members of the company happened to be a qualified chemist.

Lord Young: It would make no difference.

Dean of Faculty: I do not see how it could, but the Sheriff thinks that that was the ground of the judgment in the case in the House of Lords. I say that was not mentioned as a ground of judgment. My friend reminds me that there is a question of law which is stated, but I do not think your Lordships will perhaps find it necessary to consider it. The statutory offence is calling ourselves chemists and druggists, but the statute reserves the right of wholesale chemists to carry on business as wholesale merchants, and to call themselves wholesale merchants as before the Act passed. The Act only strikes at persons who carry on a retail trade. The title which we are found to have used is a title which does not fall within the statutory title at all. We call ourselves wholesale chemists, druggists and tea merchants, We do not call ourselves chemists and druggists. We call ourselves by the name of a trade which is confessedly outside the Act.

Lord Young: In point of fact you are retail dealers.

Dean of Faculty: In point of fact we do conduct a retail business. This complaint, however, is directed not against the carrying on of the business, but against the description of ourselves. It would have been quite different if the charge had been that we dispensed medicines or carried on business as retail chemists; but when the charge is with reference to our signboard and circulars I take it that the Act has not been violated.

Lord Young: I think there is a clause in the Act exempting wholesale dealers.

Dean of Faculty: Yes, the 16th:—"Nothing herein before contained shall extend to the business of wholesale dealers," and so on.

Lord Young: It refers to supplying poisons in the ordinary course of wholesale dealing.

Dean of Faculty: The point is a purely technical one, I am only charged with the using of a particular designation. That particular designation is not a designation which under the Act is unlawful. Tho only thing unlawful is taking the name chemist and druggist, and it is a different thing to call yourself wholesale chemist and druggist.

Lord Justice Clerk: In your view is there any offence under this statute which a corporation or joint stock company can commit?

Dean of Faculty: No, I think not. I shall tell your Lordship an offence which I think a corporation might be held to commit.

Lord Justice Clerk: It would be art and part in the act of the assistant.

Dean of Faculty: Yes; with that exception I do not think there is any offence that can be committed. It is right to make that exception, because it has been suggested.

Lord Young: It cannot commit an offence by merely calling itself chemist or druggist, or by carrying on that trade,—I mean the mere fact of carrying on the trade.

Lord Justice Clerk: I rather think the more consistent view is that they are not within the purview of the Act at all.

Dean of Faculty: That is the view. They may be indirectly responsible for the offences.

Lord Young: Accordingly, the prosecutor here, acknowledging that, directs his complaint against each of the individual partners and charges him.

Mr. Murray: I submit that the judgment of the Sheriff-Substitute is well founded. I may at once dispose, first of all, of the latter point which my friend did not attribute very much importance to. The offence is that of taking, using or exhibiting the name of chemist or druggist. It is quite patent that that offence would not be avoided by merely applying an epithet before the word chemist or druggist. If you called him a cheap chemist or a dear chemist, that would not take him out of the provisions of the Act. No doubt there is a certain exemption in the 16th section, but it has nothing to do with the title; it is a question of fact. It is said

that none of the provisions of this statute interfere with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing. Now, if my friend had been able to make out that the result of my complaint being sustained would have been as a matter of fact to interfere with them in their business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing, that would have brought them under the exception in the Act; but they have not got the judgment of the Sheriff-Substitute on that point. They are actually carrying on a retail trade. I think that disposes once for all of this point of law. I come now to the other question in the case. And there we are quite aware of the fact that, though perhaps not technically, because of course this Court is not subject to the House of Lords—yet practically this matter may be so far taken to be concluded by authority, and the real argument both before the Sheriff-Substitute and between my learned friends and ourselves, is what is the legitimate outcome of the judgment pronounced by the House of Lords. I think it is common ground between us that the result of that judgment is that you cannot indict a corporation for the penalty. Well, that, of course, was accepted by the prosecutor in this case, because he has not asked the corporation to be subjected to the penalty, but the individual members.

Lord Justice Clerk: And that they cannot acquire a qualification.

Mr. Murray: That I should say, with respect, is rather the argument on which you arrive at the judgment than the judgment itself, which is that the word person does not apply to a corporation. But what I point out is this——

Lord Young: I think it comes to this, not merely that a corporation may not be prosecuted under the statute, but that a corporation may call itself chemists and druggists. I think the judgment goes that length.

Mr. Murray: No. If the judgment goes that length it is against me.

Lord Young: Yes, every word of Lord Selborne's judgment is to that effect.

Mr. Murray: I was going to point out that the judgment was to this effect: they say, we do not find it necessary to extend the use of the word "person" in this statute to include a corporation in the case of sales, because we find that without doing so the provisions of the statute would strike at the person who actually commits the act; that is to say, you cannot prosecute the corporation for selling; you will have to proceed against the unqualified person who actually makes the sale.

Lord Craighill: What about keeping open shop?

Mr. Murray: I think it is in the same position. There you have also the actual person who does the thing. My point is this, that if the judgment of the House of Lords is right, this corporation cannot take, use, or exhibit the name.

Lord Justice Clerk: The keeping of an open shop by an unqualified person is an offence by itself under the statute, independent of dispensing drugs.

Mr. Murray: There are two senses in which the word "by" may be used; it may mean the act of an unqualified person keeping open shop. But if "by" meant the agent of an unqualified person, then I do not know that there would be any words to strike at it.

Lord Justice Clerk: A good deal depends on that distinction.

Mr. Murray: I quite admit that, and then I say you cannot have the corporation taking, using, or exhibiting the name; it must be somebody else.

Lord Craighill: They say the Act does not apply to a company, and that they may carry on just as before.

Mr. Murray: It is in one sense begging the question to say that it was lawful to do it before. Such a company cannot go on unless they avail themselves of the provisions for registration in section 4. That is evidently what was in the mind of Lord Justice Thesiger, who says, "I feel bound to add that I am by no means satisfied that, although a corporation, as a separate entity, be not liable to the penalty which is sought to be recovered in this case, the individual members of the corporation, whether directors of the company or otherwise, may not be liable, and thus the mischief be remedied." I would also refer your Lordships to Lord Justice Bramwell's judgment with regard to the same point, and also to the judgment of Lord Blackburn. I apply their opinions to this case, and say this corporation is not entitled to put up the title chemists and druggists.

Lord Young: The painter who puts up the sign is a "natural person."

Mr. Murray: In one sense he is, but in the sense in which the expression is used in the judgment in the House of Lords, it must be the natural person who goes to the counter and sells drugs over it.

Lord Craighill: Suppose the partners are abroad, and that not one of them is ever within the shop?

Mr. Murray: Yet they take, use or exhibit the title chemist and druggist. I say there can be no taking or using the title without the intervention of a natural person, and he shall be liable in the penalty if not qualified.

Lord Young: That means some natural person employed by the corporation. The statute does not prohibit a corporation carrying on business, but it applies to any natural person who sells drugs, that is, upon the employment of the corporation.

Mr. Murray: In the case of selling, the corporation is employing a person, but in the case of taking, using or exhibiting the name, they are doing it themselves.

Lord Young: They employ the painter.

Mr. Murray: He is the mere mechanical agent by which the sign is put up. The statute requires more than mere mechanical skill, because it requires a qualified person, and if any other sells drugs over the counter, he shall be liable. The statute is for the protection of the public, and it is to be unlawful for any person to sell or keep open shop for retailing or dispensing or compounding poisons, or assume or use the title chemist and druggist unless such person is qualified.

Lord Justice Clerk: There is a little difficulty there, because it is not the asssistant who uses the name or title; he has nothing to do with it; it is the partners of the company.

Mr. Murray: That is how I venture to put it.

Lord Justice Clerk: Therefore it would be necessary to say the fact of having a qualified agent to sell in the shop entitles these unqualified partners to put up the title chemists and druggists.

Mr. Murray: Yes. Suppose these people put up the name of Mr. Henry Forwell or Nicholas Dodds, or that they, instead of putting after the name "Leith Depôt, Limited" the words "wholesale chemists and druggists," put the name "Nicholas Dodds, chemist and druggist," then I should not have had any objection.

Lord Young: Lord Blackburn is very pointed on this subject. He says, "It seems to me that the Act plainly says, in the first section, it shall be unlawful to sell or keep open shop or assume the name of chemist or druggist," for any person, that is to say any natural person, unless he becomes a pharmaceutical chemist.

Lord Justice Clerk: Yes, but that does not strike at the point spoken of.

Lord Young: It is the designation; it is assuming the name of chemist and druggist, and that applies to the advertisements.

Mr. Murray: I do not quite see Lord Blackburn's point against me.

Lord Young: Just go on.

Lord Justice Clerk: The real question is, does the qualification of the assistant selling in the shop make it lawful for the partners of this company to call themselves chemists and druggists?

Mr. Murray: Yes, and it is no answer to say that in

the case of selling you do not prosecute the corporation because you have then got the assistant, who if he is unqualified shall be prosecuted for selling.

Lord Young: You are now upon the point of assuming the name?

Mr. Murray: Yes, that is the only one.

Lord Young: The advertisement is where the name is assumed—the signboard. The point which I meant to refer to in the passage from Lord Blackburn is this, that in his opinion, the words "It shall be unlawful for any person to assume the name of chemist or druggist, unless he becomes a pharmaceutical chemist," apply to a natural person.

Lord Justice Clerk: Exactly, and the question is whether the fact that there is a qualified assistant will entitle the corporation to do what an individual could not do.

Mr. Murray: Quite so, because I say that it is being done by the partners and not by the corporation.

Lord Young: You mean assuming the name in the advertisements?

Mr. Murray: Yes. I want to point out that the safeguards which the statute gives seem to be arranged into two classes, and the measure of security given by them is very different. First of all, there is one half which has to do with selling or keeping open shop for retailing or dispensing or compounding poisons; then the other half refers to the taking or using the name of chemists and druggists. Even assuming that the system was absolutely perfect, and that you could not have anybody assuming the name chemist and druggist unless qualified, that would not protect the public, because the qualified person assuming the name might leave the business to be done by somebody else.

Lord Young: Do you mean that a qualified man may lawfully deal in drugs, but may not lawfully announce that he does it?

Mr. Murray: The term chemist and druggist does not mean a person who deals in drugs, but a person who has passed an examination, and the corporation cannot have done so.

Lord Justice Clerk: But after all, that only leads to another illustration of the mode in which the Act is drawn, and the impossibility of applying it to a corporation.

Lord Justice Clerk: It is natural persons who make up the partnership.

Mr. Murray: Yes. I say they use and exhibit the name; that is the whole question. If these people do not use and exhibit the name there is no foundation for my complaint. If it is not they at all who use and exhibit the name, but the corporation, it is perfectly plain that I ought to have prosecuted the corporation.

Lord Justice Clerk: You hold that in the case of a trustee, if he employed an unqualified person to keep open shop, he would come within the Act.

Mr. Murray: I think so. By the provisions in section 16, it is set forth that upon the decease of a pharmaceutical chemist it shall be lawful for his executors to carry on the business, so long as that is done by a duly qualified chemist. Where you have a qualified pharmaceutical chemist who died and was succeeded by an unqualified testamentary trustee, if it had not been for the special provisions of the 16th section, he would have been struck at by the Act. Now, I was pointing out this, that the mere fact of a person being allowed to put up the name of chemist and druggist, if he was qualified, was not entirely to protect the public. The view of the Legislature seems to have been that the public are not to be attracted to the shop by the title chemist and druggist, unless it is a qualified person who exhibits the name.

Lord Young: But in the shop these people may do everything that a chemist and druggist may do?

Mr. Murray: Yes.

Lord Young: But the public shall not be made aware of the fact.

Mr. Murray: Yes, so far as this particular provision of the statute is concerned. Of course they shall not do everything that a qualified chemist and druggist may do under the provision that strikes at sales, but with refence to this case I do not at all shrink from that interpretation; they may do everything that a chemist and druggist does, but they shall not call themselves chemists and druggists unless qualified under the Act. That seems to me to underlie the whole case. Is it the individuals who take, use or exhibit, or the corporation?

Lord Young: Do you say that these people meant to announce to the public, or the public understood that each of them was a qualified chemist and druggist?

Mr. Murray: I do not know what they meant to announce.

Lord Young: That this corporation deal in chemicals through the medium of natural persons who were duly qualified.

Mr. Murray: The taking of the title necessarily means more than telling the public that you deal in chemicals and drugs; it means that, whoever does it is a qualified person in the sense of the Act. I submit that these people putting up that name told the public that they were taking, using, and exhibiting the name as allowed by the Act, but that, on the other hand, they are not doing so, because not one of those who are so taking, using, and exhibiting the name, is a qualified chemist or druggist.

Lord Young: Are they not really charged with keeping open shop in this first charge?

Mr. Murray: No.

Lord Young: The argument you are now addressing to us assumes at least that they may lawfully keep open shop for the sale of drugs and chemicals.

Mr. Murray: No. They may not keep open shop unless they are qualified. My argument assumes no more than this, that I could not in any way whatsoever exact the penalty from the corporation; but if I had to make any assumption about that at all I would go according to the suggestion of Lord Justice Thesiger and Lord Justice Bramwell. So far as keeping open shop was concerned, the people who keep open shop are not the corporation, but the people who really do it. In this case I would say they all did it; I say it is the joint act of the whole seven partners, putting up or exhibiting the name or title chemist, and that it is no answer to say that they have a qualified assistant, because it is not the qualified assistant that they put up as having the designation of chemist and druggist. If they had not put up the name of chemist and druggist after their corporate name, but had put up that designation after the name of their duly qualified assistant, I should not have said a word about it, because the public would have been protected to that extent that when it sees the designation chemist and druggist after another name it shall know that the person to whom the *sobriquet* is attached is a person qualified.

Lord Justice Clerk: But if "person" in the Act does not mean a corporation, or society, or partnership?

Mr. Murray: Then it means individuals.

Lord Justice Clerk: It only means that the penalty under the statute does not attach.

Mr. Murray: It will not attach where the act is the act of the corporation. I quite admit that. We have to consider whether this is the act of the corporation or individuals?

Lord Justice Clerk: You have to prove that it is not the act of the corporation.

Mr. Murray: I think that is just as in the case of sales in the House of Lords case, where it was held that, although in one sense the corporation were the sellers, because the proceeds went into their pockets, yet inasmuch as the Act meant a natural person, you must take it that the sales were sales conducted by the individual.

Here, although the corporation are in one sense the persons who conduct the business, yet for the purposes of this statute, the keeping open shop, or taking, using or assuming the name is not done by the corporation but by the individuals; there being no distinction of managers or directors or anything of that sort, I say it is done by the whole of the individuals. The only judgment which seems to me to go at all against my view is that of Lord Selborne, but I do not think his Lordship goes upon exactly the same grounds that the others do.

Lord Young: Lord Blackburn says, "I say that the corporation is entirely out of the clause which prohibits persons keeping open shop."

Mr. Murray: He is speaking of a sale where you have got an intermediate vendor—a natural person. Here they are out of the clause entirely which prevents their using or affixing the name, simply because you have got the actual persons, the members of the corporation, who did the act.

Lord Young: Lord Blackburn seems to be in harmony with Lord Selborne, in the view that corporations are entirely out of this clause.

Mr. Murray: I do not think he is with him upon the reasons. I think Lord Blackburn goes upon the reason that there must be some intermediate person to be struck at. I do not think Lord Selborne finds that reason necessary.

Lord Young: All the judges in the House of Lords dissent from Lord Bramwell as to the possibility of a corporation being fined.

Lord Justice Clerk: The real difficulty in the whole matter simply arises from the fact that this, which is an Act to enforce a qualification for a pharmaceutical chemist in dispensing drugs, cannot apply to a corporation, which cannot have a qualification. Perhaps it is a little wire-drawing in order to arrive at that result, but that is the substance of the difficulty. A corporation cannot be qualified, and, therefore, this statute, which is meant to make the qualification imperative, cannot apply.

Mr. Murray: The House of Lords quite felt the strength of the argument that the statute was not to be rendered nugatory. The Lord Chancellor said it is not rendered nugatory, because he held that although the corporation cannot be prosecuted for the sale, the individual can; and, therefore, although the corporation escapes, you may catch the individual. In the same way, I admit that the corporation cannot be prosecuted for putting up the title chemist, but the individual can.

Lord Young: Who put it up?

Mr. Murray: All the members.

Lord Young: That is the corporation.

Mr. Murray: I do not think so.

Lord Young: As what did they put up the sign, or issue the advertisement, except as a corporation?

Mr. Murray: As members.

Lord Justice Clerk: Does the statute require that they should have been pharmaceutical chemists before they put up that sign?

Mr. Murray: Yes.

Lord Justice Clerk: It would have been proper to have said in the statute that the employment of a qualified person by the corporation should be sufficient.

Mr. Murray: The statute has not said that. I say that the taking, using or assuming the name, for the purpose of the penalties in this statute, is an operation, not by the corporation, but by the individual members composing the corporation.

Lord Young: Then any lady, being a member of this corporation or joint stock company would be liable in the penalty.

Mr. Murray: Yes, but the remedy is very simple, not to call themselves chemists and druggists, or put up the name say of their assistant, Mr. Nicholas Dodds, as chemist and druggist.

The Court then proceeded to give judgment, which has been reported on p. 85.

The Apollinaris Company (Limited) *v.* The Apollo Water Company (Limited).

(*Before Mr. Justice Kekewich*).

This was an action by the plaintiff company, which was incorporated in 1873 with the object of exporting, importing, and selling mineral waters, especially "Apollinaris water," which is frequently ordered under the name of "Polly," "Apollo," and "Apoll." The name of the plaintiff company is also frequently abbreviated in a similar manner. The defendant company was incorporated in 1886, and the plaintiffs say they sell a mineral water coming from wells near Niedermendig, in Rhenish Prussia, belonging to one Hürter, who has recently given the water the name of "Apollo water." The plaintiffs, complaining that this water if sold would be mistaken and passed off as their goods, commenced the present action, claiming an injunction to restrain the defendant company from using the name "Apollo Water Company" or any other name so closely resembling that of the plaintiffs as to be calculated to deceive; also an injunction to restrain the defendants from offering for sale mineral waters not of the merchandize of the plaintiffs as and for the goods of the plaintiffs.

Mr. Justice Kekewich granted the injunctions claimed by the plaintiff company, with costs.—*Times.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Lord Young and the Leith Depôt Case.

Sir,—I consider the Council has been ill advised in again appealing to the courts of law, as it was so evident from the temper of the judges who decided the appeal to the House of Lords that the statute should not be extended to include the Government shops *et hoc genus omne*; and the absurdity of appealing to the judges on matter purely technical is evidenced by the astounding digression in the judgment of Lord Young, sitting in the Scotch Appeal Court. The question of chemists' charges, or their professional character, does not appear to have been before the Court, yet let us see the texture of the mind of the great Scotch jurist.

"The public are interested in having such drugs or chemicals as they require at reasonable prices, and it is matter of common knowledge that most extravagant prices are exacted, and from very poor people who have occasion to go to ordinary chemists' shops for the drugs which are prescribed to them. I was informed, as a mere illustration, by a physician of eminence and in large practice that a patient whom he had given a prescription complained to him after a while of the cost of the article. He had to get his little phial filled repeatedly, and the charge to him upon each occasion was 2*s*. The physician compassionated the poor man, and told him the two ingredients of which the article was compounded, and directed him to get one in one chemist's shop and another in another. The result was that he got for 3*d*. what made up some dozen bottles of medicine sold to him at 2*s*. each. It is not unreasonable that the public should desire that some check should be put upon such high charges by chemists."

This deserves reprinting in the Journal, and the great Scotch jurist should at once use his powerful influence to get a Royal Commission appointed to inquire into such gross malpractices. As it is we are convicted without a trial in the Scotch Court of Appeal on hearsay evidence, and that through a gossipy physician, who has to give his poor patient dozens of bottles of medicine composed of two ingredients to relieve or cure his patient. May the Lord have mercy on all that man's patients is my earnest prayer; there is no other hope for them I am sure.

Some time ago a gentleman whom I had previously known called at my pharmacy for a tonic. I had just finished preparing it, when he said, "Mr. Mee, I ought not to enter your pharmacy. I am a director of one of the large London co-operative stores, and they have been very severe on

you chemists because you are not like other trades, you must be more highly educated, and go through a long training." I jokingly replied, "Why did you not tell me before? I have given you quinine; I ought to have given you strychnine." I did not tell him why. I now tell you. Because I look upon such as he was as the rats of commerce, because he knew better. The great Scotch jurist evidently does not.

GEORGE MEE.

Sir,—One part of the judicial deliverance by Lord Young, anent the Leith Depôt case, reported in the Journal of July 23, seems to invite a word of comment.

He tells a story of a poor man who, guided by his physician, procured from two different chemists for 3*d*. sufficient medicine to fill some dozens of the phial for which he had repeatedly paid 2*s*. when dispensed from the prescription; and, evidently, the learned judge felt that he was exposing, from the seat of justice, an iniquitous extortion. His declaration, however, that "there is no grudging of the due payment for professional skill," implies a recognition of the distinction between this and ordinary transactions of sale.

Accepting for argument's sake, the perfect accuracy of the details, and assuming that "some" dozens may mean five; it would follow that the original dispenser had charged 2*s*. for material which subsequently cost one-twentieth of a penny at ordinary retail prices; so that putting aside cost of bottle, cork and label, he practically obtained a fee of 2*s*. for his services.

I may safely assert that so extreme a case as this does not occur to the average dispenser much above once in seven years, and that founding any inference upon it is as reasonable as it would be to ascribe abnormal weight to all the male inhabitants of Dover, because a near neighbour of mine happens to weigh 42 stone. If the physician who primed the judge with his remarkable anecdote had not sufficient wisdom or experience to be aware of its wholly exceptional character, it is equally surprising that the latter should have so totally forgotten the legal maxim that "hard cases make bad law." Since it is the invariable practice amongst our body to make liberal concessions to customers of narrow means, or whose requirements are of long duration, it would be interesting to know if the patient in this case had made any attempt in that direction before appealing to the compassion of his physician.

Certainly 2*s*. seems a large sum, especially to the countrymen of the frugal gentleman who said "he hadn't been long in London before bang went saxpence!" But I have heard of two hundred times that amount being paid by people of narrow means for medical attendance of no very long duration. It is rather more than half the minimum charge for a doctor's visit on the usually accepted scale, viz., 3*s*. 6*d*.; and probably as much mental application was required for the due performance of this duty as often goes to the earning by a member of Lord Young's own profession of a much more formidable sum—the familiar 6*s*. 8*d*.

The question is, does the public, including Lord Young and those who think with him, consider the dispensing of prescriptions to require, in however modest a degree, professional skill; and if so, what rate of remuneration for its performance would be ungrudgingly paid?

Dover. J. F. BROWN.

Sir,—Many, like myself, will no doubt entertain a sense of pain and slight, incurred by the undignified allegations of Lord Young in expressing his opinion upon the case of the Leith Drug Depôt.

Chemists are much subjected nowadays to the ignorant ideas of the public, but this new attack from the bench in Edinburgh is probably the most injudicious that has yet been made.

While accepting, but not without doubt, the story of the poor man and the generous physician, I think it most unfair that a generalized impression should be based upon an isolated incident. That the story in question is a gross exaggeration must be perfectly patent to all who possess any real knowledge of the business of a dispensing chemist at the present day. That a judge should give ear to such fabulous tattle, augurs badly for the future of the bench of "justice."

But admitting the veracity of this oft-told story of the poor and the grasping chemist, I fail to discern any magnitude of difference between the 2*s*. worth for the threepenny piece, and the half-crown fee of the ordinary doctor and the guinea or five guineas of his more advanced *confrère*. To approach nearer the learned judge's impressibility, let us take the 1*s*. fee of the quack lawyer and the conventional 6*s*. 8*d*. of the ordinary legal profession, not to speak of the guinea fees in the same profession.

Lord Young's onslaught is so unexpected and thoughtless that I resent it with scorn; and trust that the trade will be stimulated to whatever steps are possible to form a united front against these prevalent and false insinuations.

Glasgow. G. S. ILLINGWORTH.

Sir,—After the very able and painstaking decision of Sheriff Rutherfurd in the case, we had reason to believe that law and equity for once would prevail, notwithstanding the appeal. However, the fates decreed otherwise, and we are once more in troubled waters. The High Court of Justiciary in Edinburgh, without much self-reliance or consideration, base their decision on the judgment of the House of Lords in the case of the London and Provincial Supply Association, although the two cases are essentially different. In the Supply Association it was made manifest that the Pharmaceutical Society could not proceed against a corporation when a legally qualified assistant was employed; at the same time it was implied that individuals might not, if proceeded against, escape so easily. Indeed it does seem a strange anomaly that an individual, unqualified, calling himself a chemist and druggist, is amenable to the law, whilst seven or more individuals associated together may use the title with impunity. This is surely contrary to common sense, and ought not to exist. The Lord Justice Clerk might well say that he had arrived at his decision with difficulty; but no such hesitation seems to have animated Lord Young, for he does not stop to consider the difference that existed betwixt the London and Leith cases, but at once makes it manifest that he is in favour of co-operative stores, and goes out of his way in a most unseemly manner to attack chemists and druggists on the *ex parte* evidence of his friend the physician. One would like to know something more about the extraordinary case that his Lordship quoted—what were the articles bought for 3*d*. that would make at least a dozen bottles of mixture? Surely there must be some mistake. But after all an exceptional and most unusual case should not be taken as a precedent. Apart from this, a chemist incurs as much expense as a lawyer to fit him for his vocation, and has therefore as much right to ask for something beyond the mere cost of his drugs. Take for illustration the case of a judge commencing his legal education in a solicitor's office, and a poor client gets him to write a letter—it may only be half a dozen lines—and for this the law permits him to charge 5*s*. What would the actual cost of such a proceeding be? Compare the functions of a chemist with those of a lawyer. In the compounding of medicine life and death may be involved; the chemist can make no equivalent charge to cover his responsibility. Then why should a Lord of the High Court of Justiciary go out of his way to inflict unnecessary injury without any justification? It is difficult to see any sufficient grounds to justify the reversal of the Sheriff's decision, and I cannot think that this matter has now terminated.

M. P. S.

E. J. C.—(1) The mixture cannot be dispensed elegantly without the use of mucilage; about ℥iij would be required to suspend the iodide of ethyl ordered. (2) Soapwort (*Saponaria officinalis*).

Chemicus.—The sale of such preparations is not, in our opinion, affected by the law in its present form.

C. Turner.—We know of no better means than the use of boiling water. Perhaps an inquiry addressed to one of the gardening journals might elicit information.

H. J. T.—*Melilotus cerulea.*

Biology.—The "growth" consists of eggs of the "lace-wing fly."

K.—A preparation made by triturating equal parts of chloral hydrate and camphor together until liquefied is sometimes used as an application to joints swollen by rheumatism.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Flückiger, Hesse, Kay, Alcock, Associate, Rhigolene, Indignans, A. J. S.

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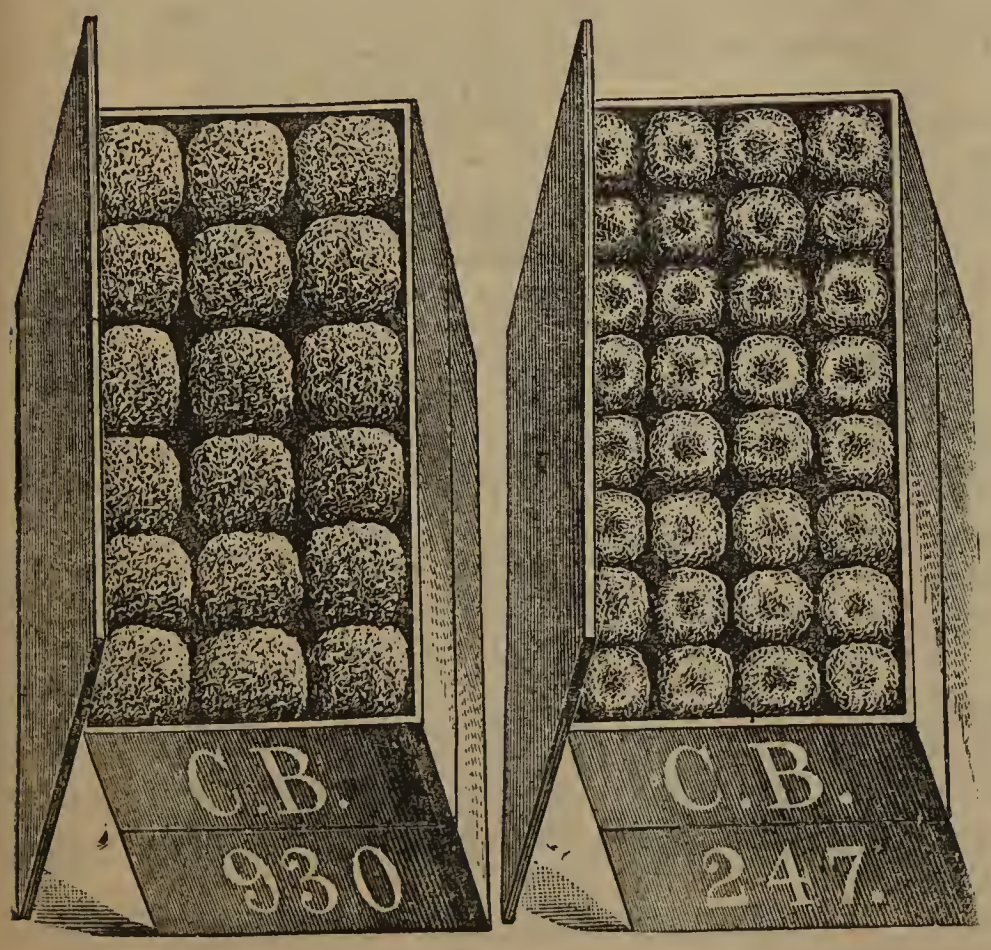

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23	1st	Turkey Solids, assorted sizes ..	100	140/
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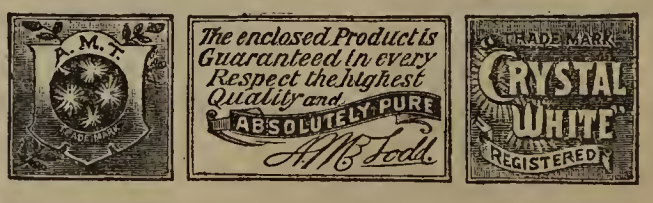

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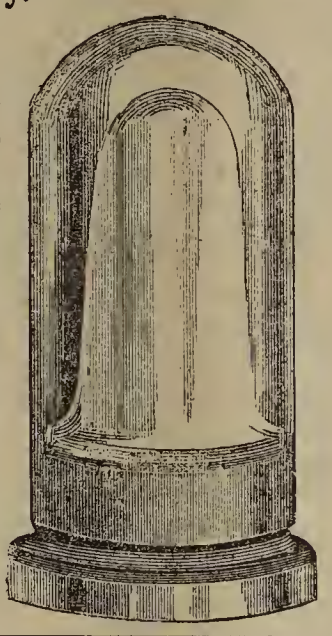

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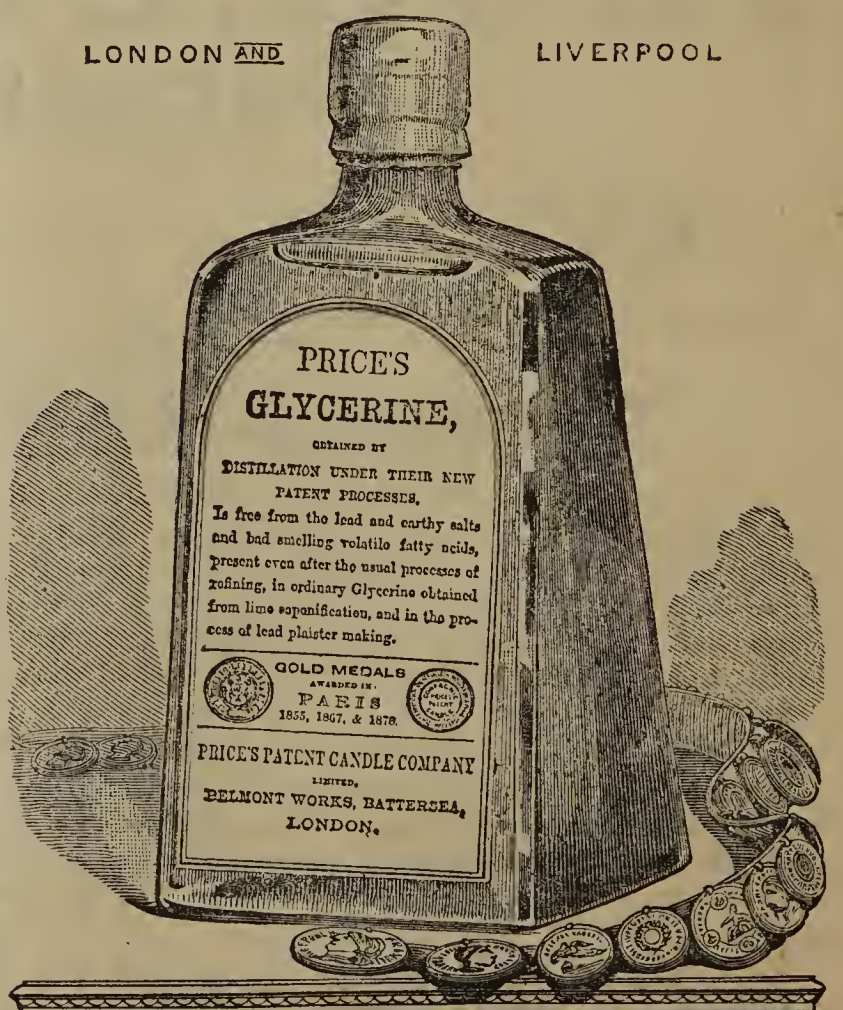

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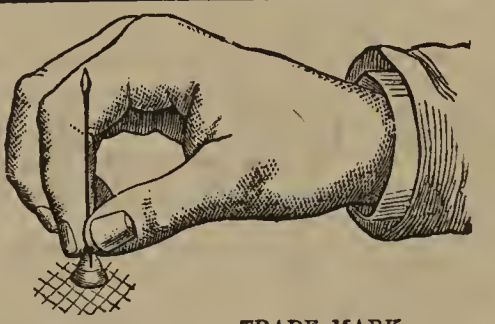
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Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics, with either botany or zoology, at the option of Candidates.

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THE TWENTIETH SESSION, 1887-8,
Will commence on the 12th September.

A class of Students not going up in July will meet on the 18th August for October; there will be room for two or three more to join them.

For Fees, &c., apply to W. BAXTER, Secretary.

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(Close to Baker Street Station).

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Mr. GIBBS. | Mr. WEBBER.

10 Minor Candidates from this School presented themselves, of whom the following **7** passed:—

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„ GARDNER. | „ MARSH
„ GRIFFITHS. | „ VAUSE
Mr. HARRY.

For Prospectus, apply to

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OF

CHEMISTRY & PHARMACY

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Mr. M. CHARLESWORTH, Keighley.
„ W. S. ALVEY, Manchester.
„ G. AIREY, Manchester.
„ W. DRINKWATER, Patricroft.
„ E. R. PATER, Newark.
„ C. A. HIGGINS, Cheetham Hill.
„ A. FIELDSEND, Penistone.
„ R. MCKIE, Blackburn.
„ H. ENGLAND, London.

Two others passed in June, viz.:—
Mr. S. SOUTHAM, Manchester.
„ F. RIDEAL, Hyde.

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The next Session will commence on Monday, September 5th.

FEES. { To the October Examination ... ... £6 6s.
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APRIL, 1887.

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MINOR.

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„ H. R. BROAD.
„ J. E. J. BUNN.
„ F. L. CARTER.
„ R. C. DAVENPORT.
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„ JNO. WRIGHT.

JUNE & JULY.

MAJOR.

Mr. H. E. LANCE. | Mr. F. J. SANSOM.

MINOR.

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„ S. SHILLCOCK.
„ A. C. T. SMITH.
„ H. L. SPINK.
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AS temporary ASSISTANT. Age 35. Minor. Undeniable references and security if desired. CHEMIST, 27, Benacre St., Birmingham.

WITH view to purchase or Partnership. Situation. Good market town preferred. A. C., The Laurels, Eye.

SOUTH of France.—As ASSISTANT. Age 24. Minor. APLIN, Torbay Pharmacy, Torquay.

JUNIOR. Age 20. Height 5ft. 6⅜in. 5¼ years' experience. T. C. WILLEY, London Rd., Louth, Lincs.

ASSISTANT. 25. Good reference and experience. London. Out-door preferred. Good Prescriber. Can Extract Teeth. B. WILLIAMS, 342, High St., Stratford, E.

AS ASSISTANT. Experienced. References. Age 34. M., 58, Trinity Sq., S.E.

AS ASSISTANT. Qualified. Age 22. London preferred. N., 5, Bramerton St., Chelsea.

AS DISPENSER or Chemist's ASSISTANT. Age 25. 9 years' experience. E. M., 11, King Henry's Rd., N. W.

AS SENIOR or MANAGER to Branch. Out-door. Age 25. London experience. Major. Excellent references. A. R., 142, Brecknock Rd.

OUT-DOOR ASSISTANT. Age 30. Good references. Disengaged. F. A. DE S., 48, Bellefield Rd., Brixton, S.W.

LOCUM TENENS. Minor. Ætat 30. Disengaged. ALPHA, 83, Lady Margaret Rd., N.W.

AS MANAGER or out-door ASSISTANT. Age 31. 16 years' experience. 5 as Manager. E. W., 26, Sydenham St., Whitstable.

TEMPORARY or MANAGER. Age 37. Prescribe. Extract Teeth. W. R. A., 33, Liverpool Rd., N.

ASSISTANT. Age 22. 7 years' experience. Coast preferred. A. A., Salisbury Rd., Bournemouth.

MANAGER of Branch, or Out-door ASSISTANT. 25. Married. Good Prescriber and Teeth Extractor. BOWEN, 18, George St., Brighton.

AS ASSISTANT. Age 25. Good experience. Disengaged. Five months at Bloomsbury Sq. as student. W. HAMBLETON, Selby.

LOCUM or MANAGER. Ætat 36. Prescribe. Extract Teeth. JUBILEE, Longfleet Poole, Dorset.

ENGAGEMENTS WANTED.

TEMPORARY, or otherwise. Experienced in Hospital work. Age 26. Qualified. THEMA, 52, Hereford Rd., W.

JUNIOR or DISPENSER. London. Time for study, 5 years' experience. Can Extract Teeth. HARKNESS. Wembdon House, Bridgwater.

DISPENSER to Surgeon. Out-door. W.B., 71, Arlingford Rd., Tulse Hill, S.W.

AS ASSISTANT. Quick and reliable Dispenser. Ætat 28. Qualified. Disengaged. ALPHA, 13, Canterbury Rd., Kilburn, N.W.

JUNIOR. 5 years' good experience. Age 20. Height 5ft. 9in. August 19th. S. H. M., 38, Western Rd., St. Leonards-on-Sea.

JUNIOR. Age 22. Good references. London preferred. W. H., Box 218, P.O., Hull.

AS ASSISTANT. Age 22. 5½ years' experience. Minor qualification. Good references. H. WILLIAMSON, Thornton Watlass, Bedale, Yorks.

MANAGER of Branch or out-door ASSISTANT. Age 25. Good Prescriber and Tooth-Extractor. AQUA, 3, Lloyd St., C.O.M., Manchester.

LOCUM or PERMANENCY. Age 28. Experienced. MINOR, 6, St. Stephens Terrace, Clapham Rd.

IMMEDIATELY. Age 24. Height 5ft. 5in. Good town experience. ALPHA, 15, Burton Crescent, Russell Sq., W.C.

ASSISTANT. 26. 10 years' experience. State salary. ALPHA, 55, Yeldham Rd., Fulham.

PART-TIME. As DISPENSER to Surgeon, or ASSISTANT to Chemist. London, S.E. preferred. Afternoon or evening. Excellent references. ASSISTANT, 8, Market St., Falmouth.

AS MANAGER. Over 20 years' experience as proprietor large businesses. Good salesman, Prescriber, and Dispenser, with thorough knowledge of all branches of the trade. CHEMIST, 26, Whitfield Rd., Upton Pk., E.

WHOLESALE. As TRAVELLER. Well known in Lancashire, could work Yorkshire also. Connected with the retail business 25 years. SCOTT, 23, Millbay Rd., Plymouth.

AS JUNIOR, in good house of business. Aged 20. 5ft. 8in. Over 4 years' experience in good class City retail and dispensing establishment. BREWER & MARSTON, 105, London Wall, City.

FOR a few weeks as ASSISTANT. Age 23. West-end experience. Good reference. Manor Farm, Cliddesden, Basingstoke.

MANAGER or ASSISTANT. Married. 24. Good Dispenser and Prescriber. Dentistry. Good references. ROCHELLE, Selsdon Rd., West Norwood, London.

AS ASSISTANT. Minor qualification. Age 22. Height 5ft. 9in. Disengaged. E. M. CARRUTHERS, 21, St. John's, Bedford.

JUNIOR. 3 years' good experience. Age 21. Height 5ft. 8in. Please state terms, L., 200, Abbey Rd., Barrow-in-Furness.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

JUNIOR ASSISTANT, for the office. Must be a neat and rapid writer. Apply by letter first, to SAVORY & MOORE, 143, New Bond St., London.

ASSISTANTS WANTED.

DISPENSER, in a good class business. Not under 22 years. State experience and usual particulars. Apply, Mr. TULLETT, care of Southall Bros and Barclay, Birmingham.

AN English ASSISTANT. Apply to LONDON DISPENSARY, Biarritz, France.

A THOROUGHLY competent ASSISTANT, in-doors, for Retail counter, who has had experience in a first-class provincial house. Good address and recommendation indispensable. State age, salary required, references, with photo, to CHAVE & JACKSON, Pharmaceutical Chemists, Hereford.

OLDHAM INFIRMARY.—A DISPENSER. Application, stating age, previous situations, and salary, to be addressed to the SECRETARY. A married man preferred.

A GOOD Junior ASSISTANT, accustomed to good class Retail and Dispensing. Apply personally if possible, to F. W. KENT, Pharmaceutical Chemist, East Moulsey, Hampton Court.

LOCUM TENENS wanted to take charge of small Retail every Wednesday evening from 6 p.m. to 10-30 p.m. Apply by letter only, stating full particulars as to terms, &c., to X. Y. Z., 167, Mare St, Hackney, E

AT once, an ASSISTANT for about a month, to assist during holidays. Applications not answered in 3 days may be considered declined. Address, SUBURB, A. S. Hill & Son, 101, Southwark St., S.E.

AN ASSISTANT, trustworthy, active and obliging, age about 23. Good references indispensable. Abstainer and member of Christian church preferred. Send photo (to be returned), terms, age, and full particulars. CHEMIST, 20, Queen Sq., High Wycombe.

ABOUT the middle of August, a quick and accurate Dispenser. Qualified, about 24 years of age. 5 or 6 others kept. Hours of business 8 a.m. to 7·30, except Saturday, 10 o'clock; very little Sunday duty. Apply to PHILADELPHUS JEYES, Northampton, stating age, height, references, salary, enclosing carte to be returned.

JUNIOR. August 2nd. Minor. In-doors. For branch at South Hampstead, N.W. Cash business. Must be well up in Dispensing and Counter. Also one for making B.P. preparations and stock. Apply with usual particulars to J. H. LEWIS, 22, Great Portland St., W.

SURGEON'S Retail. IMPROVER, with slight experience, required. Duties light, and ample time for reading. Good opportunities for Dispensing and making Pharmaceutical preparations. Abstainer preferred. Board, lodging and everything found. No salary at present. Written applications, giving references, and stating experience to J. E. C., 1, Edwardes Terrace, Kensington, W.

AT once.—A pushing young man. About 19. As JUNIOR. State age, experience, reference and salary. Out-door. J. CARTER, 4, Melville Terrace, Woolwich.

A QUALIFIED man for the Wholesale. A thorough practical knowledge of Chemistry and Pharmaceutical Preparations indispensable. Apply, personally, 37, Newington Green Rd., London, N.

AN ASSISTANT, about 21 years of age. W. MACGEORGE, 346, Essex Rd., London, N.

A JUNIOR ASSISTANT, about 20 or 21, of good manners and address, in a Dispensing Homœopathic business. No previous knowledge of homœopathy necessary. Apply, with full particulars, salary, &c., to SMITH, 10, Norman Rd., St. Leonards-on-Sea.

HAMILTON, LONG & CO., State Apothecaries and Chemists to the Queen, 3, Lower Sackville St., Dublin, have a vacancy for a Junior ASSISTANT. Apply, enclosing carte, stating age, height, references, and salary required.

ASSISTANTS WANTED.

A THOROUGHLY competent and experienced HEAD ASSISTANT for India. Must be energetic and able to take entire management if necessary. Bachelor's quarters provided. Apply, with full particulars and copies of testimonials, to E. M., care of Allen Bros. & Co., Albion Pl., London Wall, E.C.

EXPERIENCED ASSISTANT, about 15th August, for first-class business, to take charge during absence of proprietor, who resides away. All found except board. Junior kept. State age, height, salary and references, with photo, to Mr. AMOS, Harbledown, Canterbury.

DISPENSER wanted. Time for reading. Apply, stating age, salary and references. SURGEON, Wycombe House, Coventry.

AN energetic ASSISTANT, about 24 or 25, of good appearance and address, wanted as first Counterman in a good class business. Enclose carte and full particulars of experience, age, height and salary required, to C., 90, Western Rd., Brighton.

A GOOD Dispensing ASSISTANT. Apply to JAMES STEWART, 389, High St., Cheltenham.

QUALIFIED man, not under 24. Good Dispenser, to take sole charge during absence of Proprietor. Duties light. Particulars to M. M., care of Mr. Dutton, Chester Rd., Birkenhead.

QUALIFIED ASSISTANT, age 22 to 25 years, for Mixed business. Must be steady. Able to Prescribe and Extract Teeth. One seeking permanency preferred. Apply, HUGH FAIRHURST & Co., Ph. Chemists and Mineral Water Manufacturers, Warrington.

IMMEDIATELY, an ASSISTANT, about 22, with good address, well up in Dispensing, &c. If by letter, send photo, with full particulars, to J. W. TAPLIN, 4, Fortune Gate Terrace, Harlesden, N.W.

IMMEDIATELY, smart pushing ASSISTANT, used to good class business. Would be required to wait upon shops, private families, &c., one or 2 days weekly. Send photo and full particulars of experience, religious belief, salary expected, &c., to HAMP, Messrs. Hearon, 5, Coleman St., London, E C.

BARRITT & DIX, Chemists, 81, High St., Croydon, require a good Junior ASSISTANT, not under 22 years of age and accustomed to Dispensing. State age, height, salary required, references, and when disengaged, &c., enclosing carte if convenient.

A QUALIFIED ASSISTANT, about 24. Apply personally, DECASTRO & Co., 32, St. George's Pl., S.W.

SENIOR ASSISTANT. A thoroughly competent man. Must be quick, active, and well up in every branch of the business, and capable of taking entire charge in the absence of the principal. Must be qualified. Between 27 and 30. 6 others employed. Apply to W. THOMAS, 103, Talbot Rd., Bayswater.

IMMEDIATELY. Thoroughly competent and energetic ASSISTANT of gentlemanly appearance (who can speak Welsh) for seaside. Apply, with full particulars (unexceptionable references required), E. D., 8, High St., Wolverhampton.

IMMEDIATELY. Indoors. A Junior ASSISTANT, accustomed to a good class country trade. Must be a good counterman, churchman preferred. Apply with full particulars to W. BISHOP, Chemist, Grantham.

BY August 8th, competent ASSISTANT about 23 or 24 years of age to manage branch. Apply (personally preferred) to R. MORGAN & Co., 5, Liverpool St., E.C.

AN IMPROVER. Salary £15 to £20. Also an ASSISTANT, about 24, to take charge of a branch shop. Must be steady and a good Counterman. M., Messrs. Evans & Lescher, 60, Bartholomew Close, E.C.

BUSINESSES FOR DISPOSAL.

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MESSRS. BERDOE & CO. have for transfer :—Home County. Returns £2200. Net profit £700. Price £1500. Gloucestershire. High class Dispensing, making 400 net profit. Price £850. Sussex Coast (not Brighton). Returns £800. Net profit £300. Price £650. Kent Coast. Neglected business. Returns £5 weekly. Only £150. Wilts. Returns £850. Price £550. Essex. Returns £600. Price £420. Hants. High class Dispensing. Net profit £600. Price £1500. London, S.E. Returns £800 by manager. Price £700. S.W. Returns £400. Only £185. Details on application. Apply, 30, Jewry Street, Aldgate, City.

VERY old established Business of a Chemist and Druggist to be disposed of in one of the main thoroughfares of Manchester owing to death. Excellent opportunity for an energetic and practical dispenser. Price very moderate. For particulars apply, Vendor, 31, Meadow St., Moss Side, Manchester.

SMALL Business, but thoroughly genuine. Good living for a young man. This must be sold within 14 days, therefore no reasonable offer will be refused. Including fixtures, bottles, stock-in-trade complete. Full particulars on personal application to Geo. Pratt, Auctioneer, Railway Approach, Sydenham, S.E.

A GENUINE old-established Business, in a good country town, 56 miles from London. Shop nicely fitted, well stocked, and in excellent position. Satisfactory reasons for disposal. Only placed in the market last week. Price about £850. Full particulars from Chemist, care of T. Hunt, Esq., Stratford-on-Avon.

LONDON, S.E.—A genuine ready-money Retail and Prescribing Business. Nicely fitted shop. Fairly stocked. Returns nearly £400. Capable of increase by energetic man. Rent, with good house, £40. Lease 13 years. Good opening for dentistry. Price £320. Address, Chemist, care of Mr. Bowden, 10, Princes Sq., Kennington, S. E.

SURREY.—Old-established cash Retail and Prescribing Business. Grand position, main road, house, 7 rooms, 70ft. garden. Rent on lease £50. Price £350. Part can remain. Open to investigation. Trial given. Owner taking larger business. X.Y.Z., Messrs. Sanger & Son, 489, Oxford St., W.

IMMEDIATELY.—An old-established Homœopathic Business in the central part of a good market town, West of England, carried on by present proprietor for 25 years. No goodwill, simply stock, fixtures, &c., at valuation. Apply F. W., care of Mr. Jas. Buckpitt, Bridport, Dorset. No agents.

A GENUINE Dispensing, Prescribing, Light Retail Business, returning £550. Well stocked. Modern mahogany fittings. Good position, main thoroughfare, with every prospect for increasing the returns. Price £500. 10 miles from London. Mr. C. Martin, 14, Doddington Grove, Kennington, S.E.

A GENUINE old-established Chemist's and Druggist's Business at Great Yarmouth. Price for stock, &c. £450. Open to offer. Shop and house at low rental, or freehold will be sold. Particulars of Mr. Wm. Sayer, Solicitor, 13, Clifford's Inn, Fleet St., London, E.C.

£150.—In London suburb, through death of late proprietor. Light Retail, Dispensing and Prescribing Business. Returns about £5 a week, and improving (at present under female management). Good house. Rent £40 per annum; half let off to good tenants. Taylor & Co., Transfer Agents, 79, Queen St., Cheapside, London.

BUSINESSES FOR DISPOSAL.

BIRMINGHAM.—Homœopathic and Allopathic combined. In good thoroughfare. Agency attached pays rent. Price £250. Apply E. A., 5, Warstone Lane, Birmingham.

LONDON, S.E.—A good Family Business in main thoroughfare. Established about 25 years. Nearly all Dispensing and General Retail. Returns for last year about £670. Price £650. W. T. W., care of Mr. Charles Martin, 14, Doddington Grove, Kennington Park, S.E.

IN West-end.—Owing to death of proprietor. Price about £500. Fullest investigation. Apply by letter to Ernest H. Collins, 19a, Coleman St., E.C.

NEAT, General, and Dispensing Business in Boro' of Derby. Populous neighbourhood, on tram route. Premises have monopoly. Small well assorted stock. Rent £36. At lump sum or valuation. Capital required about £250. Apply, E. Belfield, Hotel and Trade Valuer, Market Pl., Derby.

WANTED, a Partner, with £500 to £600, to assist in taking over some old established Businesses, or a Partnership would be accepted. Partner, care of Messrs. Newbery & Sons, King Edward St., London.

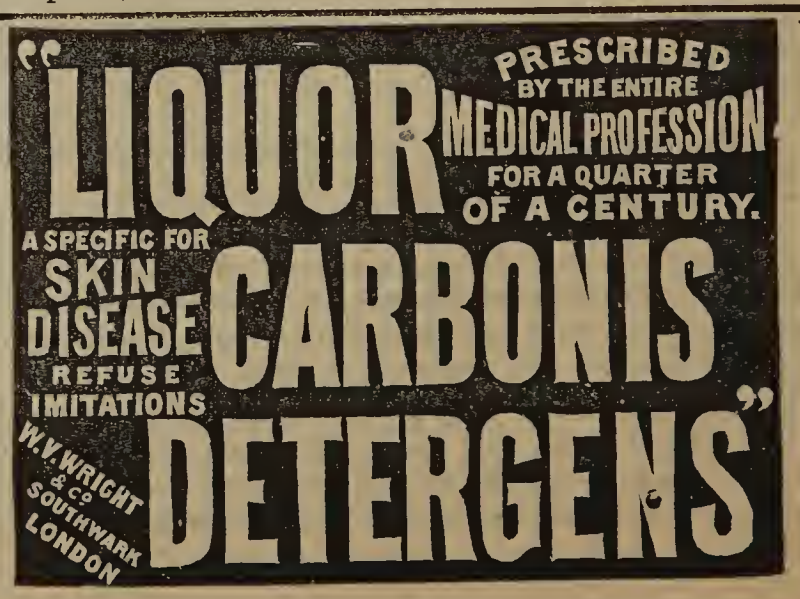
IN the main thoroughfare of a thriving Staffordshire town, a light Retail, Dispensing and Prescribing Business for disposal. Good profits. Established 50 years. Price £400, or would sell at a valuation. Apply, T. W. B., care of Southall Bros. & Barclay, Birmingham.

FIRST-CLASS old established good Dispensing Practice. Leading position in Coventry. Death proprietor cause of disposal. Splendid chance for enterprising man. Lease. Large well fitted shop, capital fixtures and appointments. Premises in thorough repair. Open to every investigation. Apply, Messrs Phillips & Carr, Solicitors, Birmingham.

SOUTH Staffordshire.—An old-established genuine light Retail and Prescribing Business, chiefly Prescribing, very few patents kept, full prices. Returns £300. Valuable lease, small rent. Price £220. A. W., care of R. N. Watts, King St., Derby.

A GENUINE Dispensing and Family Retail Business, very pleasantly situated in Canonbury, Islington. Been in present proprietor's hands 10 years. Returns may be doubled by constant personal attendance. A personal interview best. Apply for particulars to T., care of Messrs. Hearon, Squire & Co., 5, Coleman St., City, E.C.

£380.—In main thoroughfare of important suburb of London. A very profitable Retail, Prescribing and Dispensing Business. Handsome little Pharmacy, well stocked. Rent very low. Convenient house. Lease alone is worth £100. Returns £400. Taylor & Co., Transfer Agents, 79, Queen St., Cheapside, London.



F. J. BRETT,
VALUER, LEICESTER,
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VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Probate and Fire Insurance valuations.

WALES, S.—Death vacancy. Old-established RETAIL, in good town. Returns average £1200. At valuation, about £800.

NOTTS.—Good Family RETAIL. Good prices. Present hands 30 years. Returns average £1000. Price £900.

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BRISTOL.—Light Retail, Dispensing and PRESCRIBING. Good prices. Returns £8 week. Price £270. Rent low.

NOTTINGHAM.—BRANCH in good position. Returns £6 week; can be doubled. Valuation £150; half can remain.

YORKS.—Good Retail and PRESCRIBING, with Agricultural and Mineral Waters. Returns £1500. Valuation £700; part can remain on security.

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KENT (Seaside).—Light Retail and DISPENSING. Full prices. Returns £870. Price £750. Good house at low rental.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

MR. G. B. CROCKER,
Valuer, Transfer Agent & Accountant,
15, WALBROOK, E.C.

KENT.—Light Retail, Prescribing and DISPENSING. Very profitable trade. Good house. Fine position. Returns £800. Price £600. An excellent investment.

LANCASHIRE.—Mixed Retail and PRESCRIBING, with Post Office. Returns £600. Price £350.

DURHAM. — Mixed Retail and DISPENSING. Returns £1450. Price £1050. £450 may remain.

LONDON, S.E.—Retail and Prescribing TRADE. Returns £300. Price £200. Pretty little shop.

LONDON, N.—Good ready-money TRADE. Principally Prescribing. Large house and well fitted shop. Moderate rent. Price about £700. Really sound investment.

WANTED.

A CHEMIST'S Assistant to join another in starting a business in connection with the Drug Trade in London. Capital required, £100. Address, CALABAR, 30, Barford Rd., Birmingham.

TOWN HALL AVENUE, BOURNEMOUTH.

A Shop to Let, suitable for a Chemist or Druggist. Apply to JAMES H. MOORE, Bournemouth.

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A. WALES BERRY begs to give notice that the business of a Chemist and Druggist, lately carried on by him under the style of "SHEPHERD & Co.," at 139, High Street, Guildford, will in future be carried on by him at the same address in his own name, Mr. G. P. Shepherd having ceased to have any interest in the said business from 18th December, 1884.

CHEMISTS' TRANSFERS.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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2. LONDON, W.—Good class, old-established BUSINESS, situate in a first-rate business locality. Returns at present at £500. Profits above the average. Convenient house. Price about £500.
3. LONDON (near).—Death vacancy. Good class Retail and DISPENSING. Returns nearly £1000. Good house and garden, well situate. About £900 required, to include house fixtures. Nett profits from business nearly £400.
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WANTED.

WANTED.—Partnerships or first-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly. Cash ready.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

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A MEDICAL man, of large London experience, is desirous of obtaining apartments, with a view to practice with a Chemist in a London suburb. Address, Dr. MAGOR, St. Columb, Cornwall.

TRADE "SANITAS" MARK

THE GREAT ENGLISH DISINFECTANT.

COLORLESS, FRAGRANT AND NON-POISONOUS.

"Sanitas" Disinfecting Fluid, *1/- Bottles.*	For use in the house; colorless, non-poisonous, fragrant; does not stain.
"Sanitas" Disinfecting Oil, *1/- and 4/- Bottles.*	For fumigations and inhalations.
"Sanitas" Disinfecting Emulsion, *1/- Bottles.*	For the disinfection of Refuse, Sewers, Drains, and for general out-door use.
"Sanitas" Crude Disinfecting Fluid, *1/- Bottles.*	
"Sanitas" Insecticide and Liquid Soap, *1/- Bottle; 5/- per gallon.*	Also prevents corrosion of boilers.
"Sanitas" Sheep Dip, *In Bulk only; 5/- per gallon.*	Cheapest and best.
"Sanitas" Toilet Fluid, *1/- and 2/6 Bottles.*	A delightful mouth wash, and for finger glasses.
"Sanitas" Disinfecting Powder, *1/- Tins.*	For ashbins, earth closets, stables and kennels.
"Sanitas" Tooth Powder, *1/- Boxes.*	Antiseptic and free from grit.
"Sanitas" Toilet Powder, *1/- Boxes.*	For the skin of children.
"Sanitas" Disinfecting Bar Soaps, *No. 1 and No. 2—6d. and 4d. per Bar.*	For washing and scrubbing.
"Sanitas" Disinfecting Soft Soaps, *No. 1 and No. 2 in Bulk only.*	For washing paint and general use.
"Sanitas" Antiseptic Toilet Soap, *1/6 Boxes.*	Best in the world.
"Sanitas" Brown Windsor Soap, *7-lb. and 14-lb. Boxes, 4/8 and 9/3.*	Economical for families and hotels.
"Sanitas" Animal Soap, *1/- Bottles.*	For horses, dogs and cats.
"Sanitas" Soap Powder, *In Bulk only.*	For scouring and disinfecting.
"Sanitas" Jelly, *1/- and 3/6 Pots.*	A dressing for wounds, burns and sores.
"Sanitas" Veterinary Ointment, *2/6 Tins.*	For dressing the wounds of animals.
"Sanitas" Furniture Cream, *1/- Bottles.*	Is also a household disinfectant.
"Sanitas" Disinfecting Fumigators, *3/6 each.*	Prevent the spread of disease.
"Sanitas" Antiseptic Gauze, *2½d. per Yard.*	A dressing for Surgeons' use.
"Sanitas" Air Purifier, *1/- Tins.*	Acts by mere exposure.
"Sanitas" Urinal Tablets, *1/- Boxes of Six Tablets.*	Also for placing in cisterns of water-closets.
"Sea-Water Sanitas," *2/- Bottles.*	For use in the bath, &c.

"Valuable Antiseptic and Disinfectant."—*Times.*

"Safe, pleasant and useful."—*Lancet.*

The "SANITAS" COMPANY, Limited,

LETCHFORD'S BUILDINGS, THREE COLT LANE, BETHNAL GREEN, LONDON, E.

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The
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AND
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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 22nd to September 5th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

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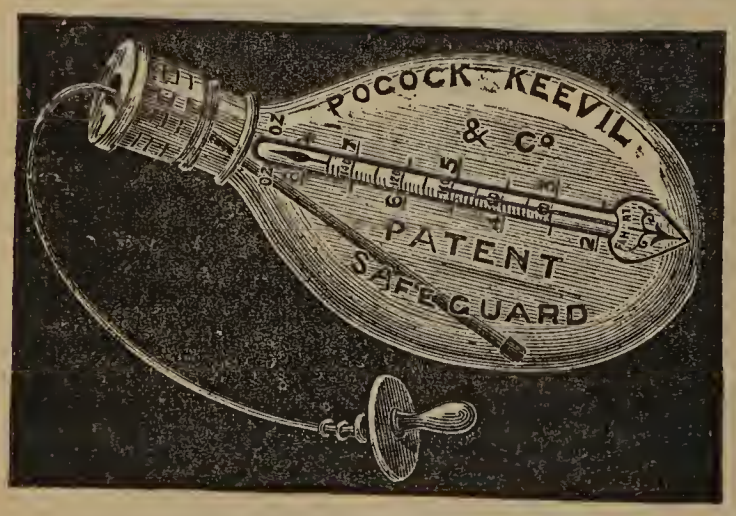

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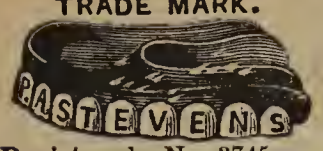

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THE EXHIBITION AT MANCHESTER.

Notwithstanding that there is a general similarity in the exhibitions that have now become so familiar a feature with us, many of them present strong individual characteristics, due to the influence of local conditions, or, it may be, to the special object for which the exhibition is held. Thus there is a well-marked distinction between the Colonial Exhibition held at South Kensington and that now open in the cotton metropolis of the North. The former drew unprecedented samples of raw material from every quarter of the globe; the other, held in a city that is a centre of numerous manufacturing industries, is rich in a display of finished products and the machinery used in producing them. Some exhibitions have been open to the reproach, entailed upon them by the necessity for offering to possible exhibitors a tangible and present return for the expenses incurred, that they have approximated too much to large bazaars. But it may be claimed for the "jubilee exhibition" which has been open during the past two months at Manchester, that it is primarily and essentially an exposition of arts and manufactures. It is not pretended that this exhibition is altogether free from trivial elements, or that the whims and weaknesses of Demos have been altogether lost sight of; but if tobogganing and fairy lamps are provided for holiday folk, and Old Manchester and Salford be not free from ludicrous features, there is enough in the Manchester exhibition to occupy the attention and inform the mind of the most studious visitor during many days. The exhibition is officially declared to have for its object the illustration of the progress and development of arts and manufactures during the Victorian era, and the Executive is to be congratulated as to the manner in which this object has been attained. For those who affect the fine arts there is a collection of modern pictures such as they will rarely, if ever, have the opportunity of seeing again; those with mechanical tastes may wander through acres covered with whirling machinery; whilst others may satiate themselves with viewing exhibits of the products of the industries which have carried the fame of Manchester and its neighbourhood to the ends of the world. Only a portion of the third of these classes can, however, be suitably discussed in these columns, but it is hoped that a few notes upon some of the exhibits in the Section of Chemical and Collateral Industries may prove to have *raison d'être*, and may perhaps be of assistance to some readers who may visit the exhibition during the coming visit of the British Pharmaceutical Conference to Manchester.

The Section of Chemical and Collateral Industries is located in two courts on the south side of the principal building, one on each side of the dome, and both abutting upon the Talbot Road, which separates them from the "Machinery in Motion," and is crossed by a covered bridge. The two "Chemical" courts together cover an area of about 700 feet by 60 feet. The exhibits number upwards of two hundred and fifty, and are arranged in fifteen groups, one or two of which require some grace to bring them within the defining terms of the section. In dealing with them for the purposes of this notice no attempt will be made even to mention the majority of exhibits, but only to refer to sufficient to indicate the general character of the section, and especially the points of interest it presents to pharmacists.

Following the order of the official catalogue, the first group consists of "Chemical and Chemical-Physical Apparatus." An exhibit that is sure to attract notice here is a compartment in which the Committee of the Section has placed a collection of Geissler's tubes, the beauties of which are displayed at stated hours. Another exhibit worthy of attention close by is a chemical laboratory table and fittings, shown by J. Heywood of Manchester, which is stated to have had the approval of Sir Henry Roscoe. Very appropriately some of the shelves above this table are filled with a very good looking collection of glass chemical and physical apparatus, shown by J. Woolley, Sons, and Co., of Manchester, which is fairly matched by a similar collection shown by Mottershead and Co. The German makers of such instruments are also represented by one of their own countrymen in F. Muller, of Bonn. Another kind of apparatus is shown by Doulton and Co., consisting of the stoneware retorts, stills and condensing worms, acid resisting pipes and taps, and other goods for which this firm is famous. A "tintometer," or apparatus for measuring colour, is exhibited by J. W. Lovibond, of Salisbury. The principle of this instrument lies in the use—as standards for comparison—of series of coloured glasses, graduated as to depth of colour in multiples of the unit adopted for the lower end of the scale. Several articles likely to be of interest to pharmacists and pharmaceutical manufacturers are shown by Follows and Bate (Limited), of Manchester. Among them is a powerful tincture press with a hopper of nine gallons capacity, and estimated to be capable of exercising a pressure of six tons, the whole being arranged so that no part of the material operated upon shall come into contact with a metallic surface. There is also a one-gallon iron tincture press, as well as a drug mill for grinding dry friable materials, such as ginger, gentian, or copperas, and assortments of pestles and mortars and mechanical mixers. Some other objects in this group that may be mentioned are chemical balances, shown by Otto Wolters, London, and microscopes and microscopical appliances by E. Ward, Manchester; there is also an assortment of the portable appliances for extinguishing fire, of the types that have become familiar during recent years.

Group II. is devoted to "Hygeine," using that word in a more limited sense than is generally the practice, which incorrectly extends to the goddess of health the qualities of healer of disease attributed to her father Æsculapius. Most of the exhibits in this group are of the nature of preservatives of health in the shape of disinfectant and sanitary preparations, though not including any very important novelty. One exception is a display by Mottershead and Co., of Benger's preparations of the natural digestive ferments as well as peptones and peptonizing liquids and powders. Another consists in samples of lanolin and lanolin preparations shown by Burroughs, Wellcome and Co.

Group III. includes the products of "Destructive Distillation." Of course, the most striking of these products are the various pigments that are commonly spoken of collectively as the "coal-tar colours." As might be expected in the heart of the calico industry these are richly represented, though they require the knowledge of an expert to appraise them at anything like their proper value. The display by Levinstein and Co. and by the British

Alizarin Company, Limited, may be instanced as being typical. The former firm shows in a smart-looking case a large number of the coal-tar dyes, as well as the raw materials from which they are made, and the intermediate products. The latter firm presents specimens of anthracene, and illustrates the stages in the conversion of this substance into alizarin, anthrapurpurin and flavopurpurin and the use of these compounds in the dyeing and printing of fabrics and yarns. In this group, arranged close together, is a quartet of "exhibits of chemical research" that vividly illustrates the progress of discovery in one portion of the chemical domain during the Victorian era. One of these cases is shown by Dr. Perkin, "the discoverer of the first coal-tar colour, and the originator of the coal-tar industry." It contains many interesting articles, among them specimens illustrating the discovery of mauve, the first aniline dye, and a specimen of it as first made by Perkin in 1858. It will be remembered that Dr. Perkin has pointed out how fortunate it was for the future of the coal-tar colour industry that mauve, the first compound lighted on, should have happened to be one of the fastest of dyes, and that the more evanescent coal-tar dyes should have been discovered later. There are also specimens of parasafranine, first obtained by the oxidation of mauveine, and the forerunner of the beautiful group of "safranines," and of the acetyl derivative of rosaniline, known as "Perkin's green," which was the first aniline printing colour. In addition there are specimens of coumarin, the artificially prepared representative of the odoriferous principle of the tonka bean, and cinnamic acid, both of them first obtained synthetically from coal-tar materials by Dr. Perkin, and the latter now used for preparing artificial indigo. In an adjoining case Dr. J. Peter Griess illustrates his discovery of the azo and diazo colours, one of the first of which to find practical use was the celebrated "Bismarck brown." A third case, shown by Dr. Schunck, contains a complete collection illustrative of his researches on the colouring principles of madder and the constituents of indigo. The fourth case, containing specimens of vanadium and tungsten and their compounds, illustrative of Sir Henry Roscoe's researches, can hardly be deemed products of destructive distillation, though brought into contact with them by the use of vanadium in aniline black printing. Another class of products of destructive distillation, more closely connected with pharmacy, is met with in the display of carbolic acid and allied products by Charles Lowe and Co., of Manchester. Still more strictly medicinal coal-tar products, in the shape of salol and antifebrin, are to be seen in the case of B. Kühn, whilst close by is an exhibit of Fahlberg's much heralded "saccharin." Other cases contain displays of the bye-products in the gas manufacture, and the results of shale distillation.

Group IV., "Lakes, Pigments, Paints and Varnishes," is sufficiently described by the title, being rather outside the scope of these notes. Nevertheless it includes many displays of considerable chemical interest, as, for instance, the case of C. Scheu, of Manchester, illustrating the manufacture of artificial ultramarine, including the raw materials—soda, china clay and sulphur—a model of the furnace used, and the finished products. These latter, although not affording such variety in colour as the splendid exhibit of Guimet in the Paris exhibition of 1878, include besides the normal compound some beautiful examples of the more highly oxidized green and violet "ultramarines." A glass fountain located amongst this group is worthy of passing attention, the device of using tinted water imparting to it a curious fluorescent appearance.

Group V., "Bleached and Coloured Fibres," is another group that although full of technical interest is itself hardly suited for detailed description here. But it is redeemed from want of interest to pharmacists by the presence of a select exhibit collected by Mr. Watson Smith on behalf of the Committee of the Section, containing many articles well worthy of examination. The chemical antiquarian may see there the balance with which Sir Humphrey Davy worked, and the battery used by him in decomposing the alkalies, together with a manuscript account of his work on potassium. There he may also read a part of the manuscript of Dalton's 'New System of Chemistry,' relating to his discovery of the law of atomic weights. Of more recent date are the specimens of gases liquefied by Faraday, and the manuscript in which he described their liquefaction. There is also a specimen of a sample of carbon tetrachloride prepared by Faraday. There is besides the apparatus with which Dr. Joule determined the mechanical equivalent of heat in 1849. There is also a case containing a vast number of articles of quite a different character, being in a fact a complete *olla podrida*. Amongst these may be mentioned a bottle containing twenty-four ounces of "saccharin," which quantity is represented as being equal in sweetening power to three cwts. of sugar; this is accompanied by "saccharin" bonbons and liqueurs. Then there are samples of indophenol or artificial indigo; piperonal or artificial heliotropin, which has found a use in medicine as well as in perfumery; artificial coumarin and artificial vanillin. Another interesting set consists in the products of the condensation of the crude gases from a blast furnace, which are identical with the ordinary products of the destructive distillation of coal. There are also a number of samples of raw material from the vegetable kingdom, such as cinchona barks, logwood, resins, etc.

(*To be continued.*)

ADDITIONAL NOTE ON WURRUS OR WARS.

BY PROFESSOR FLÜCKIGER.

In my "Contributions to the History of Wars" (*Pharm. Journ.*, June 18, p. 1029) I suggested that the peculiar drug to which my paper was devoted might be due to a glandular formation.

There is another way still of explaining the curious substance. Professor Arthur Meyer informs me that he regards it as consisting of nothing else than the actual starch grains of the seeds of *Flemingia*, supposing the seeds to have been soaked and boiled in water. Professor Meyer had some of those seeds treated in this way and then mixed with red sand. The large starch grains were indeed altered so as to resemble closely the matter described by Mr. Kirkby as well as by myself.

It remains, therefore, to be proved whether the people of Harrar really submit the seeds or pods of *Flemingia* to such a process, perhaps in order to get a cheap kind of substitute for true wurrus or kamala.

From my historical considerations in the said paper it would appear probable at all events that the drug under notice has been in use for centuries either as an inferior medicine or as a sophistication.

TEETH PRESERVATION.

The care of the teeth forms the subject of a recent interesting communication to the *Therapeutische Monatshefte* by Professor Miller. According to the author caries of the teeth is due to the formation in the mouth of free acids from carbohydrates, under the influence of ptyalin, invertin and bacilli. Of these lactic acid is formed most plentifully, whilst acetic acid and butyric acid are to be considered only as bye-products of the lactic acid fermentation. Professor Miller states that he has succeeded in obtaining pure cultures of no less than fifty different species of bacteria taken from the mouth, among them *Leptothrix buccalis*, *Vibrio buccalis*, *Spirochaete dentium*, *Streptococcus magnus*, *S. medius* and *Staphylococcus pyogenes aureus*. It is important to bear in mind that fermentation does not go on in the main cavity of the mouth, but in the depressions, fissures, interstices and cavities of the teeth, in which through imperfect cleansing portions of food are left; also that the action of the acid is much more energetic during the night than in the day, when it is removed by food and drink and the salivary secretions. Such places as give opportunities for continual formation of acid are named by Professor Miller "caries centres," and to render them innocuous must be the object of any rational system of teeth preservation.

The best means for this purpose is a suitable tooth brush, but it must be so employed that with its help all the teeth can be reached. The author promises little result from the use of tooth powders, because although these may make the front teeth white, they rather stop up than purify the caries centres. As more suitable for the purpose he recommends "tooth soaps," because the fatty constituents cleanse without attacking the teeth, whilst they to some extent facilitate the penetration of the brush into the caries centres. They should, however, be prepared from neutral soap, and be themselves neutral, or only faintly alkaline in reaction. The following formulæ are given of preparations that have been tested:—

Magnes. carbon., Rhiz. irid. flor., Talci, Sapon. medicati	āā 5·0 gram.
Ol. menth. pip.	gtt. x.
Mucil. acac.	q.s. ut fiat massa.

Calc. carbon. præc.	100·0
Rhiz. irid. flor.	5·0
Oss. sepiæ pulv.	4·0
Sacchar. alb.	2·0
Myrrh. pulv.	2·0

Mell. et glycerin. q.s. ut fiat pasta.

In respect to a mouth water intended as a preservative of the teeth, the author stipulates that it should not simply prevent the development of the fungoid vegetation, but that it should kill it within one minute. The requirement is not met, for instance, by peroxide of hydrogen, since a 5 per cent. solution failed to kill the fungoid growth in fifteen minutes. The following formulæ are given for suitable preparations :—

Thymol	0·25 gram.
Acid. benzoic.	3·00
Tinct. eucalypti	15·00
Alcohol. absolut.	100·00
Ol. gaultheriæ	gtt. xxv.
or Ol. menth. pip.	gtt. xx.

S. One teaspoonful to be added to a glass of water.

Thymol	0·3 gram.
Sp. cochlear., Sp. meliss. comp.	āā 30·0
Tinct. ratanh.	10·0
Ol. menth. pip.	0·5
Ol. caryophyll.	1·0

S. Ten drops to be added to half a glass of water.

DR. DALLINGER ON MICRO-ORGANIC LIFE.

Last week, on the occasion of assuming the presidential chair of the Devonshire Association for the Advancement of Science, Literature and Art, which was holding its twenty-sixth annual meeting in Plympton Guildhall, the Rev. W. H. Dallinger, LL.D., F.R.S., delivered an extremely eloquent and interesting address, in which he dealt especially with the progress that has been made recently in the investigation of the biology of micro-organisms, to which he himself has contributed so greatly. The following are some passages taken from the address:—

Dr. Dallinger commenced with some picturesque observations upon the correlation between the natural and physical sciences and literature and art. The man of science, the artist, the poet, the man of letters, all approach Nature by different paths, each in his own way to be quickened under his perception of her beauty, her order, her rhythm, her inexpressible grandeur; and then, in the language that is essentially his own, each expressing that beauty to us. Turning to his own particular work, Dr. Dallinger first spoke of the rapid and beneficent aggression of science. It had so moved forward that to grasp any leading branch of it in all its details required a man of exceptional power. The absolute hard facts of science are the possession of the specialist only. Nature's deepest secrets are first revealed to that untiring industry that long and lovingly will wait until the smallest detail of new truth is disclosed, and esteemed a noble reward. But as a specialist Dr. Dallinger could say that his danger is insulation, and the scientific specialist should know, and should be content to know, that he is but a mental fragment in the glorious whole—one particle of colour and form, as it were, in the great mosaic of natural knowledge.

The microscope had made known to us that the realm of minute life outside the reach of our unaided vision was quite as wonderful, and even more populous and varied than the world of life that our eyes may see. But none of the recent improvements in lenses had found a limit to minuteness. He had measured thousands of *Bacterium termo*, which are fair typical specimens, that never exceeded the one-twenty billionth of a cubic inch. That is to say that a sphere, representing a cubic inch, could contain of these organisms a number equal to the entire human population of the globe, multiplied ten thousand times. Yet it has all the mystic and marvellous properties of life. It moves continuously with a rhythmic darting motion; and that motion can be as well effected when adverse to the pull of gravity as when coincident with it; and to effect its motion it is possessed of a pair of flexible fibres, which, as it were, beat out the music of its march. How true it is that man's mind realizes its powers and exercises its functions at a point between two infinities—the infinitely great and infinitely small. At one moment the conception of spatial vastness carries the mind out into bourneless abysses that dilate without horizon, and are lost in the infinite; at another instant the mind, requiring no dimensions for its action, is absorbed in the study of minuteness, which is as defiant of limit as the spatial amplitudes were of receiving a finite border.

But it is not only that this minuteness is without limit. The mind of the student is also impressed with its beauty. The snowflake becomes a casket of crystallic jewels, of forms so delicate, so complex, of such ideal symmetry as to entrance the observer. The very rocks in their ulti-

mate structure are often literally built of invisible and imperishable atoms of beauty. It is well known that the gleaming of the ripples on the summer sea, when night has fallen, is due to a countless population of microscopic infusorians that flash like the glowworm with every movement of the waves. But it is not usually so well known that a population equally vast may occupy a glass of apparently clean water. If you drop a few shreds of fish-muscle or other organic matter into a clear glass of water at this period of the year it will in less than twenty hours be alive with an absolutely invisible population which no man can number. If you examine with a competent microscope a small speck of the fluid it will be seen to be crowded with minute bodies—straight, curved, spiral; all in the intensest and most beautiful motion. These are the bacteria; but if the pabulum be rich enough, and the putrefaction be suffered to continue, the fluid speedily becomes peopled with organisms, slightly larger, and possessed of distinct form and motile fibres. These are the heteromita, or monads. They may be oval or lenticular, or shaped like an hour-glass or a chalice or a sub-oval rod. Most of them consist of colourless homogeneous protoplasm, within which is seated a minute glassy globule, called a "nucleus." Their motions are of a most graceful and varied order, and in the majority of cases are directed to a specific end.

In most picturesque language Dr. Dallinger illustrated his meaning by typical instances, and he went on to speak of what is more generally interesting and important—the metaphysical side of the question, known as the theory of spontaneous generation. If we would find out how these minute organisms existed we must study their life histories, we must demonstrate. Let us, continued Dr. Dallinger, consider a single life history, which shall be typical. I select that of a monad, which until I found it was unknown to science. It has been named by Mr. Saville Kent, I almost regret to say, *Monas Dallingeri*. Measured cubically it is the seventy-thousand-millionth of a cubic inch. It is a long oval with one motile fibre. The egg-like body is clear, and, to our means of analysis, structureless; in the minutest speck of the fluid thousands are present. Their motion is quick, definite, and graceful. While in full motion a change of form, which is somewhat uncertain, takes place for from a minute to ninety seconds, and then the motion becomes slower, the flagellum or motile fibre becomes sluggish in its movement, and falls off. We then have a still-flattened globule. In a few seconds there appears in it suddenly and vividly a white cross forming two diameters at right angles. Almost immediately afterwards another cross appears, so placed in relation to the first that they together constitute eight radii proceeding from a common centre. This complete, the whole interior substance of the living atom is in a state of movement which results in its being broken up into a large number of bodies that glide for some minutes over each other, but retain as a mass the globular shape. This suddenly breaks up and sets free a large number, usually thirty-six, relatively small forms, exactly like the original body of which they were now independent living parts—the thirty-sixth part, in fact, of the primal organism. But they are intensely active, and as they absorb and digest everywhere, and live in their food, they rapidly reach the normal full-grown size, but no sooner is this done than each of these goes again through the same process, and thus the organism multiplies by this means alone in a ratio that is, when not considered as an element of adaptation to its special work in nature, simply astounding. The human population of the globe is immense; yet one of these organisms starting to divide in this way at any given moment would in three hours have given origin to a host that would equal it. This, however, is not the most important method, physiologically considered, by which these minutest of living beings increase. It is a process that is exhausting to the vitality of the organism, and ultimately ceases. But another method is for ever at work. When self-division has proceeded for a given time, varying with the species, but always regular in the same species, a marked change takes place in the final fissions; that is, if we follow a dividing monad when the first division is effected, we can only study one of the divided organisms; the others being free to depart in different directions, each one dividing again. But it is only possible to keep one under observation, and when it divides again only one of that sub-division can be studied, and so on. But when we reach the last act of fission a change takes place. It does not proceed again to divide, but becomes more or less unlike the normal form, according to the species. In this instance it grows larger, and the front half of its oval body becomes sparsely granular. It swims with great rapidity, and goes almost immediately into the midst of a group of the ordinary forms. One of these becomes attached to it, and the two swim together, their flagella moving in concert. But it is soon manifest that the substance of the smaller form is melting into the larger, until in a short time "either is" wholly "melted into other;" but there is no loss of action for about two minutes, when the flagella fall off, and a clear sub-oval globule, perfectly inactive, falls to the floor of the stage. It remains inactive, undergoing no discoverable change for thirty-six hours; and then it bursts, emitting an incalculable host of minute spores, or generic products, which under observation rapidly change. They are, when first seen, semi-opaque, globular points; but they rapidly lose their opacity and elongate, passing through successive stages of growth, until the full characters of the normal adult are attained, when they begin almost immediately to pass through the self-division into many, which I before described. This is a life cycle typical of the entire group. It thus becomes apparent that the teeming hosts of these putrefactive organisms, as a group, containing the minutest forms accessible to us in Nature, are as dependent upon parents for their continuity as the most elevated organic forms; that there is no more caprice in their vital activities, than there is in the Vermes or the Insecta. Their life cycles are as definable as those of a crustacean or a bird. No vital phenomena not to be found amongst higher and larger organisms are discoverable in this minute field of living things.

Another difficulty put forth by scientists who have jumped to the conclusion that there can be such a thing as spontaneous generation, was that these forms would reappear in vessels hermetically sealed and heated to points demonstrably destructive of the adult, but Dr. Dallinger proceeded to show, as the result of the most patient and complete experiments, first, that the heat which would destroy the adult form would not destroy the spore, and, secondly, that these living minute forms were subject to the Darwinian law of adaptation and survival, and could be induced to flourish in a heat more than twice as great as that to which they were originally accustomed. There is much, concluded the learned doctor, that compels reflection in all this splendid power and activity in so minute a domain. But you will note that it is only a closer and finer record of methods in nature than is here revealed. Athough we appear to be lifting the very veil that hides the sanctum and mystery of life, it is not so. We are no nearer to the solution of the problem of how life results from its component elements, in the monad than in the man. But the value of such details is not in and by themselves; their meaning is only discoverable by a comprehensive light thrown from all the biological sciences enabling us to discover how, or whether, they adjust themselves to, and take their place with, other kindred phenomena, and thus give us a wider basis for generalization, or a more definite index to the vital processes pertaining to the living and multiplying cells, of which the simpler and most complex forms of life are composed and enabled to multiply.

The Pharmaceutical Journal.

SATURDAY, AUGUST 6, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE EFFECT OF THE ARGUMENTS IN THE SCOTCH CASE.

IT will be seen from the report of the proceedings at the Council meeting last Wednesday, that if any further steps are to be taken in regard to the application of the Pharmacy Act to companies, they are to form the subject of future deliberations, and as it happens that there is no opportunity for appealing against the decision that has been given by the High Court of Justiciary in Scotland, nothing further can be looked for in that quarter. Under these circumstances, it would be unadvisable to enter upon any discussion of the means by which it might be possible to give practical effect to the general scope and purport of the Pharmacy Act. The intention of that Act was undoubtedly to secure personal qualification of the persons engaged in carrying on the business of a chemist and druggist. But as matters now stand, the House of Lords has decided that a corporation or a company formed under the Limited Liability Act is not a person amenable to the provisions of the Act, and by the later Scotch judgment it has been decided that the liability of the shareholders of a company for non-compliance with the provisions of the Act is limited by the fact of their holding that position. Apparently the practical result is to reduce the Pharmacy Act to a dead letter, so far as concerns companies carrying on the business of a chemist and druggist. This position of affairs is of serious importance, inasmuch as it so far directly negatives the principle laid down in the preamble of the Act, that it is expedient for the safety of the public that persons carrying on business as chemists and druggists should have been examined as to their practical knowledge, with the view of ascertaining that they possess a competent practical knowledge of their business. It is true that the law still applies to persons individually engaged in the business, and that so far as they are concerned the objects of the Act are secured, but the persons in this position naturally feel that injustice is done to them by opening the door to evasion of the Act by companies. However, it is not merely from this point of view that objection may be taken to the decisions above mentioned. There is a wider ground for dissatisfaction, for if it be desirable in the public interest that persons carrying on the business of a chemist and druggist should have the legal qualification for which the Act provides, that necessity should apply to all who are thus engaged without distinction or limitation of any kind. It is from this point of view that the prosecutions of companies have been instituted by the Society. It is not, as Lord YOUNG supposes, a contest between the established chemists who want to keep up prices and the joint stock companies and stores who want to bring them down; but it is a contest involving the question whether the provisions of an Act of Parliament passed in the general interests of the public are to be upheld or not, and it is but fitting under the circumstances that the Council of the Pharmaceutical Society should have formally entered a protest against the misrepresentation of the objects of its action in instituting these proceedings to obtain a vindication of the law. That action has been the simple fulfilment of a duty imposed upon the Council of the Society by Parliament, and there is nothing to justify the imputation that it has been taken with a "trades union interest."

In reading the report of the lengthy discussion that took place between the judges and the counsel engaged on both sides when the appeal was heard one cannot avoid being struck by the vague and incoherent character it presents, and above all it is remarkable how little the actual provisions of the Act appear to have been understood or appreciated. At the very outset they were incorrectly represented by the counsel for the appellant company as requiring that persons holding themselves out as chemists and druggists should not only have passed certain examinations, but also have become members of the Pharmaceutical Society. And, again, the judgment of the House of Lords was almost as incorrectly represented to have decided that the exemption of companies from liability to the provisions of the Act was based upon and connected with the condition that the business of such companies should be conducted by duly qualified agents. So far from that having been the case, the Lord Chancellor SELBORNE, as well as Lords BLACKBURN and WATSON, regarded the qualification of the actual seller in the case before them only as a circumstance which induced them to take the view that under such conditions the object of the Act would not be frustrated. That was done moreover partly in conformity with the interpretation of the Act as striking at those who actually conduct sales but mainly as an inference from the provisions of the 16th section of the Act. Lord SELBORNE specially qualified his opinion on this point by saying that he thought the argument as to the Act being frustrated would have been extremely strong against companies being permitted to carry on business, if there had not been safeguards against the sale of poisonous drugs in a manner contrary to the provisions of the Act. From the same point of

view Lord BLACKBURN thought it necessary to state that he could not hold a corporation was entirely free from liability under the Act altogether, for as there could be no sale without a natural person to manage it, he thought that person would clearly be liable to penalty if unqualified, and that the infringement of the law might even be brought home to the company by which it was caused. Lord WATSON was still more emphatic in expressing his opinion that when the intention of the Legislature was considered, considerations of policy preponderated in favour of the argument on behalf of the Pharmaceutical Society, and his judgment against the Society was given upon the ground that the intention to include companies was not specifically stated in the 1st and 15th sections of the Act.

But though there is nothing in these expressions of opinion to justify the construction put upon the Act by the counsel for the appellant company in the Scotch case it is not unsatisfactory to note that they all convey a sense of the necessity for a personal qualification of persons actually engaged in carrying on the business of a chemist and druggist. The plea of the Dean of Faculty that a company consisting of unqualified shareholders might carry on this business, provided it was conducted by duly qualified agents, also indicates some appreciation of this necessity, and throughout the whole of the discussion the same view is repeatedly made manifest. The Dean of Faculty not only stated that his contention was to the effect that upon a just construction of the Pharmacy Acts it is enough that a company dispensed drugs by agents who have the qualifications provided by the Act, but he went the length of admitting that if anyone not qualified compounded or dispensed drugs for a company he would be liable to the penalties of the Act. This was an adoption of the view expressed by Lord BLACKBURN, and as regards the necessity for personal qualification it is important to bear in mind how unreservedly that view was accepted and insisted upon by the counsel for the Leith Depôt. In arguing that the Act only struck at natural persons, he maintained that according to the true construction of the Act, such a person without a qualification selling or acting otherwise in contravention of the prohibitions of the Act would not be entitled to defend himself on the ground that he is an agent and not a principal—that he has a master behind him either in the person of a limited company or of any natural person. This argument was supported by reference to the offence of compounding medicines of the British Pharmacopœia except according to the formulæ of that Pharmacopœia, and it was contended that this showed the actual dispenser or compounder of the medicine was struck at by the 15th section of the Act, so that its purpose was thus sufficiently served. This recognition of the necessity for personal qualification on the part of persons actually engaged in carrying on the business of a chemist and druggist may be regarded as in some degree a mitigation of the disappointment very generally felt at the failure of this second attempt to enforce the intentions of the Pharmacy Act, and it has been so much more complete in the Scotch case than it was either in the appeal to the Lords Justices or in the appeal to the House of Lords in the case of the London and Provincial Supply Association, that we believe there is ground for satisfaction that this point, at last, has been established. If it be the case, as the Dean of Faculty contended, that it does not matter in the least whether the shareholders of a company carrying on the business of a chemist and druggist be qualified or not, whether they be many or few, it is at least some satisfaction to know that it is admitted to be necessary that the persons engaged in carrying out the details of the business must themselves be qualified as the law provides or else are liable to the penalties attaching to its infringement.

The applications for the appointment of Professor of Botany in the Society's School of Pharmacy have not only been numerous but have come from men of considerable ability and scientific position. The successful candidate is Mr. Joseph R. Green, who was unanimously recommended by the Committee of Selection as being most suited for the purpose of the Society's work, and great expectations are entertained that his zeal and enthusiasm for research will reflect credit on the Society and the School.

* * *

This year the members of the Society will have the satisfaction of hearing the Inaugural Address on the opening of the session delivered by another eminent member of the medical profession, Sir Dyce Duckworth, who has kindly undertaken this task.

* * *

Lord Wemyss has introduced into the House of Lords a short Bill, entitled "An Act to amend the Law relating to the Sale of Adulterated Commodities," which, if passed, would make some important alterations in the existing law upon this subject. In the first place it would appear that the inconvenience attending the judgment of the House of Lords placing corporations outside the scope of penal laws in which they are not specifically mentioned is making itself felt in other directions than in pharmacy, for the Bill includes a provision that "person" includes a company. In respect to offences it also provides that the vendor of a commodity shall be deemed to warrant the same to be unadulterated unless at the time of the sale he shall tell the purchaser that it is adulterated, or that it has been expressly purchased as the manufacture, composition, or mixture of some other person and is then sold in the same condition as it was when it was supplied to the vendor. Another clause provides that proof that any commodity sold is adulterated shall be *primâ facie* evidence that the vendor knew it to be adulterated at the time of its sale or delivery.

* * *

The thirty-fifth annual meeting of the American Pharmaceutical Association will be held in the city of Cincinnati, Ohio, commencing on Monday, September 5, at three o'clock p.m.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 3, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Evans, Greenish, Hampson, Hills, Newsholme, Radley, Richardson, Robbins, Savage, Schacht, Southall and Symes.

The minutes of the last meeting were read and confirmed.

Honorary Member.

A letter had been received from Professor Maisch, thanking the Council for the distinction he had received in being elected an Honorary Member of the Society.

Election of Mr. Butt.

Mr. Butt thanked the members of Council for their confidence in him, as evinced by electing him to fill the vacancy caused by the retirement of Mr. Williams. In the future he hoped to do as he had done in the past, devote his time more especially to the detailed work of the Council and the Society, work which was, in his opinion, of as much importance, and as conducive to the proper carrying on of the business of the Society, as making long speeches at that table.

Address to the Queen.

The President reported the receipt of a letter from the Home Secretary, acknowledging the receipt of the address from the Council, which had been graciously received by Her Majesty.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society:—

Brumwell, Charles Wesley.
Buchanan, Margaret Elizabeth.
Cairns, Frederic Arthur.
Coleman, Frank Henry.
Cooper, George Thomas.
Davies, Edward Charles James.
Fields, Tom William.
Lance, Henry.
Phillips, Alfred James.
Tench, Sidney Edward.
Thomas, John.
Thomson, Isaac William.
Williamson, Leonard Wright.
Wokes, Thomas Simiuson.

Addition to the Register.

The Registrar reported that—

Rowland Campion, 166, High Street, Deritend, Birmingham,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Brumwell, Charles Wesley.....London.
Cairns, Frederic Arthur .....Southport.
Clubb, William Herbert.....Liverpool.
Davies, Edward Chas. James...London.
Lance, Henry .....London.
Phillips, Alfred James.....London.
Tench, Sidney Edward .....London.
Williamson, Leonard Wright...Darlington.

Chemist and Druggist.

Rowland Campion, of Birmingham, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Cartwright, Arthur .....Henley-on-Thames.
Fieldsend, Arthur .....Penistone.
Hall, Reuben .....Bath.
Price, Walter .....Builth Wells.

ASSOCIATES.

The following, having passed their respective examinations and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Andrew, Charles William .. ...Penzance.
Andrews, Charles Russell .....London.
Ashfield, Armishaw.....Stratford-on-Avon.
Baker, Alfred John Edward ...St. Austell.
Baldwin, George Joseph .....Loughborough.
Bostock, John .....Wilderspool.
Broomfield, Walter Henwood...Monmouth.
Cain, James Harold ....Douglas.
Carruthers, Ernest Murray.....Cambridge.
Charlesworth, Moorhouse .....Saltaire.
Chapman, John .....Bedford.
Chapman, Thomas William ...Birmingham.
Cox, Arthur Wellesley .....Yeovil.
Cox, Frederick Hudson .....Southampton.
Davies, David .....New Quay.
Drinkwater, Weston .....Patricroft.
Duck, William George .....Cardiff.
Eberlin, Albert .....Sheffield.
Ferryman, Herbert .....Rugby.
Giles, William .....Wallsend.
Glendinning, Robert .....London.
Goodfellow, Edward .....Thrapston.
Ground, Thomas ....Birmingham.
Hanson, Arthur William.....Devonport
Higgins, Charles Alfred.....Manchester.
Hoare, William Herbert.....Windsor.
Jenkins, John .....Pembroke.
Kirkup, George John .....Newcastle-on-Tyne.
Lenton, Joseph.....Hastings.
Lister, William Benjamin .....London.
McEwan, Donald.....Dunfermline.
Markham, Walter .....Spalding.
Martell, Richard .....Portsmouth.
Metherell, John ..... London.
Morrison, John Wm. Thomas ..London.
Palmer, James Taylor .....Cambridge.
Palmer, William Mortlock .....Meldreth.
Parry, John .....Talgarth.
Penny, John.....Workington.
Pérodeau, Edward George .....Plymouth.
Potter, Herbert Mills .....Walsall.
Reid, David .....Bathgate.
Rideal, Frank .....Hyde.
Roberts, Herbert.....Halifax.
Smith, Alexr. Cyril Thompson..Horselydown.
Spink, Harry Laing.....Westminster.
Stewart, Thomas Henry .....Penzance.
Strick, John Richards.....Penzance.
Taylor, Frederick Kaye .....Bradford.

Thomas, Dan .....Hafod.
Thomas, Henry Owen .....Rhyl.
Troup, William .....Southport.
Walker, Charles Herbert .....Hull.
Wilson, George Waite.....Boston.
Wilson, John Codnor .....London.
Young, Wm. Fulton .....Kilmarnock.

Modified.

Roberts, Francis .....Durham.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Bell, Robert Henry .....Sunderland.
Bird, John.....Manchester.
Blewett, William Thomas .....Penzance.
Donaldson, George .....Portsea.
Douthwaite, Harry Fryer .....Charlbury.
Greaves, William Abraham ...Ironville.
Hickes, Charles Edward .....Pocklington.
Hoit, Alfred Henry.....Southsea.
Hornsby, James William .....Darlington.
Ison, Charles Edward .....Atherstone.
Midwood, Edwin .....Liversedge.
Pereira, Frederick Arthur .....London.
Robertson, David Stewart .....Rutherglen.
Settle, Victor Alfred ... .Coventry.
Shelley, Philip .....Coggeshall.
Watkins, Alfred .....Lincoln.
Whitelock, Henry Winstanley..Hastings.
Woods, Joseph Francis .....Liverpool.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

SUPERINTENDENTS AND DEPUTY-SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

The following gentlemen were appointed Superintendents and Deputy-Superintendents of written examinations for the ensuing year.

Superintendents.

Aberdeen .....Strachan, Alexander.
Birmingham .....Southall, Alfred.
Brighton .....Gwatkin, James Ross.
Bristol .....Stroud, John.
Cambridge.....Deck, Arthur.
Canterbury .....Bing, Edwin.
Cardiff .....Munday, John.
Carlisle .....Thompson, Andrew.
Carmarthen .....Davies, Richard Morgan.
Carnarvon.....Lloyd, William.
Cheltenham .....Barron, William.
Darlington .....Robinson, James.
Douglas, Isle of Man ...Brearey, Arthur William.
Dundee .....Hardie, James.
Edinburgh.....Stephenson, John B.
Exeter .....Broom, William Willey.
Glasgow.....Kinninmont, Alexander.
Guernsey .....Collenette, Adolphus.
Hull .....Bell, Charles Bains.
Inverness .....Galloway, George Ross.
Jersey .....Ereaut, John.
Lancaster .....Vince, James.
Leeds.....Reynolds, Richard.
Lincoln .....Maltby, Joseph.
Liverpool .....Symes, Charles.
London .....Taylor, George Spratt.
Manchester .....Wilkinson, William.
Newcastle-on-Tyne ..... Martin, Nicholas Henry.
Northampton ... .Bingley, John.
Norwich.....Sutton, Francis.
Nottingham .....Parker, William Henry.
Oxford .....Prior, George Thomas.
Peterborough .....Heanley, Marshall.
Sheffield.....Ward, William.
Shrewsbury .....Cross, William Gowen.
Southampton..... .....Dawson, Oliver Robert.
Truro .....Percy, Thomas Bickle.
Worcester .....Virgo, Charles.
York .....Sowray, Joseph.

Deputy-Superintendents.

Aberdeen .....Reid, William.
Birmingham .....Churchill, Walter John.
Brighton .....Savage, William Wallace.
Bristol .....Pitman, John.
Cambridge .....Hoare, William Parker.
Canterbury .....Amos, Daniel.
Cardiff .....Coleman, Alfred.
Carlisle .....Hallaway, John.
Carmarthen .....Davies, R. Morgan, jun.
Carnarvon..... .....Francis, James.
Cheltenham .....Fletcher, John.
Darlington .....Hutchinson, Rev. E.
Douglas, Isle of Man ...Kneale, L. S.
Dundee .....Hardie, James Miller.
Edinburgh.....Ainslie, William.
Exeter .....Harris, Henry William.
Glasgow.....Davison, Thomas.
Guernsey .....Dupuy, Edgar.
Hull .....Stoakes, Benjamin M.
Inverness .....Galloway, George.
Jersey .....Le Seeleur, George.
Lancaster .....Arkle, William.
Leeds.....Smeeton, William.
Lincoln .... Battle, John Scoley.
Liverpool .....Parkinson, Richard.
London .... { Allen, Charles Bowen. / Moon, Harry.
Manchester .....Wilkinson, George.
Newcastle-on-Tyne .....Stuart, Charles Edward.
Northampton .....Mayger, William D.
Norwich.....Corder, Octavius.
Nottingham .....Beilby, Alfred E.
Oxford .....Thurland, Henry.
Peterborough .....Saunders, James Henry.
Sheffield.....Newsholme, G. T. W.
Shrewsbury .....Blunt, Thomas Porter.
Southampton..... .....Spearing, James.
Truro.....Anstey, John Upham.
Worcester .....George, Henry.
York .....Wilson, Thomas William.

REPORTS OF COMMITTEES.

BENEVOLENT FUND DINNER.

The accounts of this Committee were presented, showing that a balance had been handed to the Treasurer of £1378 10*s*.

The PRESIDENT moved the adoption of the report, explaining that on this occasion, it being the usual decennial dinner, the Council undertook the management and responsibility, and, therefore, the report was presented for approval.

Mr. ATKINS asked if the President was satisfied on the whole with the result. It was rather questioned at one time whether it was desirable to hold the dinner this year on account of the Jubilee. He should be glad to find the President considered the result satisfactory.

Mr. ROBBINS said the amount raised was rather less than on the previous occasion, but was quite as much as could be expected under the circumstances.

The PRESIDENT said the amount raised at the previous dinner was about £1600 ; but, as he had said before, it must be remembered that many friends and well wishers had given very handsome donations from time to time in the intervening period. In fact since the last decennial dinner there had been more substantial donations than ever before in a similar period, and, consequently, some

of these liberal donors did not figure so largely in the special list. He desired on the part of the Council to tender to every one connected with the craft, cordial thanks for the excellent support that had been received. He was conscious of the numerous demands upon the whole of the trade in consequence of the Jubilee, and could not but feel very grateful for the handsome support that had been received.

The motion was unanimously agreed to.

FINANCE.

The report of this Committee included a recommendation that various accounts should be paid, and that a sum not exceeding £1200 should be authorized to be paid to the contractors for the new building, if required, during the next two months, on the architect's certificates. Also that £1000 Consols should be purchased on the Benevolent Fund account.

The PRESIDENT, in moving the adoption of the report and recommendations of the Committee, explained why it was suggested that the £1000 should be invested in Consols. By arrangement with the Inland Revenue department, the Society did not pay income tax on the money invested in those securities, which was understood to represent that part of the Society's property which was devoted to charitable purposes, and if the money were invested in other securities there would be difficulties about getting a remission of the income tax. He also referred briefly to the Solicitor's bill, the amount of which showed that the expense incurred in carrying out prosecutions had been less than usual.

Mr. EVANS said he did not know whether he were in order, but he should like to have the same explanation which the President gave him yesterday, as to the duties of the Finance Committee. He understood him, rightly or wrongly, to say that the members of the Committee could not question the amounts brought before them, and could only do so in Council. He yesterday expressed his opinion that one bill was rather high, but the President assured him that he had gone through it himself, and he (Mr. Evans) was in the result quite satisfied. He suggested, however, that a copy of the monthly financial statement should be sent to each member of the Council, as was done in the case of proposed grants from the Benevolent Fund, so that they could look over it, whether they were able to attend or not. There was nothing private about the statement, and he thought it would be very useful, but he would only throw out the suggestion at present, until he heard the views of other members.

The PRESIDENT said he had explained to Mr. Evans on the previous day what the duties of the Finance Committee were; they were really, for the most part, those of auditing some of the accounts, and not of criticizing them, which was the business of the Committees that had recommended them for payment. The question arose out of an account which had been before the House Committee and recommended for payment, and had also been previously examined by himself. He submitted that he was quite in order in saying that he could not entertain any criticisms on the bill at the Finance Committee, but that if any member saw anything he thought he could improve, when the charge was proposed to be incurred again, he could at the proper time suggest a different way of proceeding.

Mr. SYMES remarked that it was an experience all had gone through who had served on the Finance Committee, to fancy that they were mere automatons, or machines; he remembered doing the very same thing as Mr. Evans had done, and it was then explained to him, as it had now been explained by the present President, that the price had been fixed by another Committee, or that tenders had been obtained. There might, however, be some account which had not gone through this preliminary process, and he had sometimes thought it would be a satisfaction if there were some guarantee that due care had been exercised in checking the amount of charge in all cases.

Mr. EVANS having again suggested that the monthly sheet should be circulated before the meeting of Council,

The SECRETARY said he would like to point out that the figures were made up to the end of each month, and could not therefore be got ready to send out with the notices on the Friday previous to the Council meeting.

Mr. EVANS said the statement might be laid on the Council table.

Mr. ALLEN remarked that the greater proportion of these payments were mere routine matters, which everyone who had been on the Council any time was familiar with, and, therefore, he did not see any necessity for what was asked. The fact was, the Finance Committee was really an audit committee, and if it were not for the work it did, the Auditors of the Society would have about a fortnight's work every year.

Mr. EVANS thought if it was simply an audit committee, it should be so entitled. There were several things in this month's statement which could not be called regular payments. He was not finding fault with anything, but only suggesting that in future this statement should be prepared.

The PRESIDENT said he thought there would be no difficulty in putting on the table a copy of the statement, but it would be impracticable to send it out beforehand.

Mr. RICHARDSON having spoken in favour of the financial statement being circulated,

The PRESIDENT said there was no objection that he knew to its being on the table. The particular account which had given rise to the discussion was one which occurred annually.

Mr. ATKINS said it might be asserted that no account was paid which had not received an independent check, apart from the office, either by a committee or the President or both.

The PRESIDENT added that the account in question had been before the Committee which had ordered the work, and had been verified by himself.

Mr. HAMPSON thought there would be a great advantage in having copies of the monthly financial statement circulated, as was done with the applications to the Benevolent Fund. It would keep members posted in the monthly expenditure.

The discussion was continued at some length with reference to the details of the expenditure incurred in keeping the premises painted and in good repair, and in connection with this subject Mr. Hampson suggested that it would be a great advantage, both economically and otherwise, if means could be adopted to restore the original surface of the building, and do away with the large expenditure annually incurred for painting.

Mr. HILLS said there were one or two propositions before the Council with regard to the preparation of the financial statement, and suggested that the matter of detail should be left to the Committee.

The PRESIDENT thought this might very well be done.

Mr. EVANS said he would move that the statement be prepared and furnished to each member.

The PRESIDENT hoped Mr. Evans would not press the motion but leave the matter to the Committee, of which he was a member. The object of everyone was the same, to furnish as much information to every member of the Council as possible; but the exact form in which it should be done was a matter of detail which could better be settled by the Committee.

Mr. EVANS said he was quite content with that assurance.

The motion was then put and carried unanimously.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 51) of a registered chemist and druggist and annuitant, who died in 1881. Applicant has had six previous grants. Norfolk.

£10 to the orphan children of a registered chemist and druggist, who died in June last. Staffordshire.

£10 towards the support of the Isherwood orphans.

One application had been withdrawn, one deferred, and one the Committee had declined to entertain.

The VICE-PRESIDENT moved the adoption of the report and recommendations, which was unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
June	Day . . .	531	29	5	22
	Evening .	115	11	1	6

Circulation of books.	Town.	Country.	Total.	Carriage paid.
June . . .	134	120	254	£1 10 9½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

White (J. W.), Flora of the Bristol Coal-Field, edited for the Bristol Naturalists' Society, 1887.
From the EDITOR.

Edinburgh University Calendar, 1887.
From the UNIVERSITY.

Arnaud (C.), Étude sur le mabit et le quinquina piton, 1887.
Carles (J.), Des contre-poisons, 1887.
Daniel (F. X.), Du coffre à médicaments, 1887.
Dezeuze (C.), De l'eau à bord, 1887.
Martinenq (J.). Des farines, 1887.
Pluchon (R.), De l'opium des fumeurs, 1887.
Rouzières (J.), De l'acide lactique et des lactates employés en pharmacie, 1887.
Valat (H.), Des anesthésiques, 1887.
From Professor SOUBEIRAN.

Smithsonian Report, 1885, part 1.
From the SMITHSONIAN INSTITUTION.

Henslow (G.), Floral Dissections, 1879.
— Botany for Children, 3rd ed., 1881.
Royal Horticultural Society, Journal, vol. 8, Frost Report, Winters 1879-80 and 1880-81, by Rev. G. Henslow, 1887.
From the Rev. G. HENSLOW.

The Committee recommended the purchase of the undermentioned books:—

For the Library in London—

Prestwich, Geology, vol. 1., Chemical and Physical, 1886.
Sachs, Lectures on the Physiology of Plants, 1887.
Storer, Agriculture in some of its relations with Chemistry, 1887.
Stokes, On Light, 1887.
Pasteur, His Life and Labours, 1885.
Lees, Flora of West Yorkshire, 1887.

The Committee recommended that the Librarian do attend the annual meeting of the Library Association at Birmingham in September, and that the usual grant be made.

The Committee ordered that the Libraries and Museums in London and Edinburgh be closed in the evening during the months of August and September. The Library in London to be closed during the first fortnight in September. The Library and Museum in Edinburgh were ordered to be closed from August 22 to September 5, both dates inclusive.

Museum.

The Curator's report had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
June	Morning .	531	34	6	21
	Evening .	88	9	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

To the Museum—

Specimens of Metallic Indium, Germanium and Gallium, and of Tellurium and Selenium in crystals. From Dr. SCHUCHARDT, Goerlitz.

Specimens of Betol, Antithermin and Acetiphenidin.
From Mr. H. HELBING.

Twenty-five specimens of Chilian drugs; and specimens of Lakar Wood, Balsam Seeds and Russak Bark, from the Straits Settlements.
From the DIRECTOR, Royal Gardens, Kew.

A specimen of pure Oil of Sandal Wood.
From Dr. BIDIE, Madras.

Specimen of Seeds and of Wax taken from an Egyptian tomb. Presented by Mr. PETRIE, of the Egyptian Exploration Expedition.

Specimen of Quli Root.
From the Rev. A. J. LENNARD, Griqualand East, South Africa.

To the Herbarium—

Fresh specimens of Biennial Henbane.
From Messrs. BATTLEY and WATTS.

A specimen of *Lychnis Viscaria.*
From Mr. J. T. GRANT, Edinburgh.

The Professors had attended and reported on their respective classes.

The Committee recommended, on the application of Mr. Ince, that a form of certificate of attendance at the Pharmacy Class be prepared.

At an adjourned meeting it had been agreed to recommend that the pictures be cleaned and varnished during the vacation.

The Chair of Botany.

Fourteen applications had been received for the appointment to the Chair of Botany, from which three were selected for further consideration at another meeting. Various changes in the form of prospectus and in the arrangements for the ensuing session had been submitted by the Staff of the School and agreed to by the Committee, and it was recommended that the prospectus, etc., be sent to as many apprentices and assistants as possible.

At the further adjourned meeting to consider the applications for the Professorship of Botany the Committee had decided to recommend the Council to appoint Mr. J. R. Green, B.Sc. (Lond.), B.A. (Cantab.).

The Council went into committee to consider the details of this report, especially the appointment of the Professor of Botany.

On resuming, the PRESIDENT moved that the report and various recommendations with one exception be received and adopted, which was unanimously agreed to.

Appointment of Professor of Botany.

The PRESIDENT said that acting on the report of the Library Committee he had to propose that—

Mr. Joseph R. Green, B.Sc. (Lond.), B.A. (Cantab.),

be appointed Professor of Botany for the ensuing year on the terms recommended by the Committee, his duties to commence on October 1. The Council would be glad to hear that there had been fourteen candidates, many of them men of very considerable learning and ability, and of high position in the scientific world. The greatest care having been taken to decide on the respective qualifications of the various gentlemen, the Committee met on the previous day to see three of the gentlemen who were regarded as most suited for the purpose of the Society's work, and in the result the Committee unanimously recommended Mr. Green, and he believed the Society might be congratulated on the fact that Mr. Green was willing to undertake the duties, and that there was a probability that his zeal and enthusiasm for his work, as evidenced by the original papers he had already published in the 'Proceedings of the Royal Society' and the 'Philosophical Transactions,' would reflect credit on the Society and School.

The VICE-PRESIDENT seconded the motion, which was unanimously carried.

The School Prospectus.

Mr. ALLEN said there were many important alterations in the prospectus of the School, a new materia medica class, a new Professor, and more prominence was given to the prizes offered by the Council. Hitherto, on special occasions, prospectuses had been sent to all those to whom the Journal was sent; but he would move that a copy be sent to associates not in business, and to apprentices of the Society, as well as to Local Secretaries, with an intimation in the latter case that further copies would be sent on application. Sending the prospectus broadcast to every member and associate was, to a certain extent, throwing them away, but anyone could have a copy on application. A very small number of men throughout the country competed for the Council Prizes, and he also thought a special effort should be made to bring about a greater competition for the Jacob Bell Scholarships, which were very substantial prizes indeed. He should hope, by and by, to see a special mark attached in the Calendar to the names of the Bell scholars and prizemen, not for the glorification of the individuals, but in order to call more attention to these prizes.

Mr. CROSS, as a local secretary, thought Mr. Allen's suggestion very useful. He believed more than one pupil had been lost to the School through the local secretary not having a prospectus at hand to give to people who made inquiries. In two or three cases parents had come to him to ask particulars of the School of Pharmacy, and in some cases he had lent them his Calendar, which was a very inconvenient thing to do.

Mr. SYMES supported the suggestion, and added that as local secretary he always asked for a few copies of the prospectus, and kept some in his desk to give away when required.

Mr. NEWSHOLME supported the motion. The more that could be done in advertising the School the better.

Mr. RICHARDSON suggested that the prospectus should also be sent to secretaries of local associations, which was agreed to.

The motion was then carried unanimously.

The Botanical Prize.

It was also resolved that in future certificates of merit be not given for the Herbarium Prize competition.

THE SESSIONAL ADDRESS.

The President announced that Sir Dyce Duckworth, M.D., Fellow and Treasurer of the Royal College of Physicians, had kindly undertaken to deliver the address to the students in October next.

BUILDING.

The Building Committee had held two meetings, inspected the new buildings in progress, and made certain recommendations as to the staircase and other details.

The report and recommendations were agreed to.

It was also resolved that the President be requested to order whatever cleaning and repairs may be necessary during the vacation.

GENERAL PURPOSES.

Prize Competitions.

Botany and Materia Medica.

Professor BENTLEY had reported on the examinations for the second course, and also for the Sessional Prizes. For the former, six candidates presented themselves, the first two of whom had greatly distinguished themselves. For the Sessional Prizes there were ten candidates, two of whom obtained exceptionally high marks. The conduct of the students generally had been excellent, and their progress satisfactory.

Herbarium.

Professor BENTLEY had also reported that two collections of plants had been submitted, both of which were deserving of special recognition. The first contained over 620 specimens and the second about 320, and he recommended that a silver and bronze medal be awarded to the collectors respectively.

Practical Chemistry.

Professor ATTFIELD had presented a detailed report on the work of this class and the result of the examinations, from which it appeared that sixty-two students had been at work during the session, the average period of study being five and a-half months for nearly four hours daily; fourteen pupils had competed for the prizes.

Chemistry.

Professor DUNSTAN reported on the examinations at the end of the second course, and also for the Sessional Prizes. For the first examination four candidates entered, but no paper was of sufficient merit to justify his recommending the award of a bronze medal, but three deserved certificates of merit. He attributed this not to any negligence on the part of the candidates, but to certain defects in the arrangements of the School, which he hoped would be soon remedied. For the second examination there were eight candidates, four of the papers being above the average.

The Council Prizes.

Messrs. THRESH and RANSOM had also reported on the examination for the Council Prizes, for which there were six competitors.

The Solicitor's Report.

The usual letter from the Solicitor had been received, reporting progress of cases placed in his hands.

The Committee had considered several other cases of alleged infringement, and in several instances proceedings were recommended. The result of the appeal in the Leith case was reported, and a communication from the Scotch lawyer had been received, stating that in this case there was no appeal to the House of Lords.

The PRESIDENT, in moving the adoption of the first portion of the report dealing with the prizes, said the Council always took an interest in the welfare of the Bell scholars; but this year the Bell scholars, not being eligible to go up for the examination on account of age, were not able to compete for the Council Prizes, though one of them, Mr. White, had done exceedingly well in the class examinations. The Society might congratulate itself on the fact that the Pereira Medal had been won by Mr. Thomas, a pupil in the Society's School, and that the next, the silver medal, had been won by a young lady, Miss Buchanan, who was also a pupil in the Society's School, and a pharmaceutical chemist.

Mr. BUTT thought a portion of Professor Dunstan's report was rather inconsistent with the rest. He referred to certain defects in the system to which he attributed the fact that he was not able to recommend any bronze medal to the students of the second five months' course, whereas he spoke of the exceptionally high character of the papers for the examination for the Sessional Prizes. It seemed to him if there were defects in the system they would apply to the whole course, and that they ought to be removed. Professor Dunstan seemed to indicate that the men were incompetent to gain prizes because the system was defective.

The PRESIDENT did not think the Professor mean that exactly. He said the men were not able to get such high marks as they would otherwise, on account of a defect in the system. Candidates in the second course were very anxious to go up for their examinations, and the result was they sometimes lost a portion of their lectures, and were not so well able to show a high standard of excellence.

Mr. BUTT said it appeared they were competent to answer very difficult questions for the ten months' course examination.

The PRESIDENT said these men had had the advantage of the whole ten months' course. It simply meant that

July was not a good month for the purpose of class teaching under the present system.

Mr. SYMES said the five months' men lost relatively a larger proportion of time out of the course than the ten months' men.

Mr. HAMPSON thought the same criticism would apply to the other classes, but the other Professors had not mentioned it.

The PRESIDENT said it was desirable the Professors should keep up a high standard; in fact the Council had fixed the standard. In this case he thought Professor Dunstan merely meant to state that he did not think the men were negligent.

Prize Awards.*

The following awards were made on the recommendations of the Committee:—

Chemistry.

[Five months' course.]

Certificates of Merit (Equal.) ..... Thomas Alfred Beadle. Alfred Edward Chaston. Wm. Mortlock Palmer.

[Ten months' course.]

Silver Medal ..... Edmund White.

Certificates of Honour ..... John Thomas. Edward James Woolley. Weston Poole.

Botany and Materia Medica.

[Five months' course.]

Bronze Medal ..... Charles Russell Andrews.
Certificate of Merit ..... William Mortlock Palmer.

[Ten months' course.]

Silver Medal ..... Edmund White.

Certificates of Honour ..... John Thomas. Weston Poole. Edward James Woolley.

Certificates of Merit ..... Arthur Richard Cross. Charles William Andrew. David Reid.

Practical Chemistry.

Silver Medal ..... Edmund White.

Bronze Medals ..... Edward Young. David Reid.

Certificates of Honour ..... Edward James Woolley. Charles William Andrew.

Certificates of Merit ..... Weston Poole. George Averill. Alfred Edward Chaston.

Herbarium Prize.

Silver Medal ..... Charles Bond Smith.
Bronze Medal ..... Henry Garnett.

Council Examination Prizes.

Pereira Medal (silver); and Books value £5, presented by Mr. T. H. Hills.

John Thomas.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.

Margaret Elizabeth Buchanan.

Pharmaceutical Society's Medal (bronze); and books value £2, presented by Mr. T. H. Hills.

Charles Boulter Gilson.

The Council went into committee to consider the legal portion of the report.

On resuming, the PRESIDENT moved that the latter part of the report and recommendations be approved. With regard to the Leith Depôt case, the judgment in which had been duly reported, he might mention that it was not possible according to Scottish law to carry the case to the House of Lords, and, therefore, the judgment now given was final. Any further proceedings the Council might think fit to take would probably form the subject of future deliberation.

The report of the Committee was then adopted.

The Judgment in the Leith Depôt Case.

Mr. SCHACHT moved—

"That this Council is aware that it must, on the legal question submitted to the consideration of the High Court of Justiciary, yield to the decision; but it deems it to be its duty to protest against the assumption of some of the members of that Court that the motive of this Council in instituting the proceedings was other than the simple fulfilment of a duty imposed upon it by Parliament for the due protection of the public."

Mr. ATKINS seconded the motion, which was unanimously agreed to.

Votes of thanks were passed to Professor Bentley for his report on the Herbarium competition; to Messrs. Bowen and Blunt for their report on the Jacob Bell Memorial Scholarships examination; and to Messrs. Thresh and Ransom for their report on the Council Prize examinations.

REPORTS OF THE EXECUTIVE COMMITTEE OF THE NORTH BRITISH BRANCH.

The PRESIDENT read the reports of this Committee as already published in the Journal (see before, pp. 61, 98).

Mr. BOTTLE asked what was the meaning of the statement in the report that the question of publishing a general report of the meetings of the Executive had been referred to the Executive for consideration.

Mr. BAILDON said at the general meeting when the election took place the question was raised whether from time to time what occurred at the meetings of the Executive should be reported; whether, in fact, the meetings should be private, or whether any report should appear. Of course, the Executive had to report to the Council; but the question was whether any intimation of what took place from time to time should appear in the meantime.

Mr. BOTTLE said his view was that any report the Executive had to make should be made to the Council in the first place, and that any independent report was out of place.

The PRESIDENT said perhaps the friends in the north would find, on consideration, that the reports which could be given would not be sufficiently interesting to be worth publishing. It was not customary for the proceedings of Executive Committees to be reported.

Mr. BAILDON said no resolution had yet been come to as to what should be done, but he did not feel at liberty to rule the resolution proposed out of order. He apprehended the report which some of the members wished to have would be a very brief one, very similar to the one now under consideration, and would not in any way interfere with the report sent to the Council.

Mr. SCHACHT thought this question was a constitutional one. He had criticized the constitution of the North British Branch at the time it was framed, and he thought the members of Council had a right to ask the President, who was its principal author, his interpretation of it on this point. The question really was as to the amount of independent power vested in the North British Executive. If it were only a committee, it could only do what a committee could do; if it had independent powers it might do something else. A committee had no right to publish its proceedings certainly. Probably the law in this case would depend, as it often did, a great deal on the way in which it was administered.

The PRESIDENT did not think the constitution of the North British Branch contemplated the publication of proceedings in the full sense of the word, but an abstract of the proceedings appearing in the official Journal did not appear to him to be a breach of constitutional etiquette.

* The questions set for these examinations will be found on p. 122.

Mr. BOTTLE said his only desire was to prevent something being initiated which might prove inconvenient.

Mr. BAILDON said his own opinion was that it would be rather an advantage that the proceedings should not be entirely unknown until the regular report was presented. He rather interpreted a remark which had been made to him by one member as implying an idea that they were rather keeping their transactions in the dark. He did not think there was any idea of having an extended report, nor did he think it would be practicable.

Mr. SOUTHALL asked if it was not similar to the reports of local associations which were sent to the Journal.

Mr. BOTTLE said that was just the difference; their friends in Scotland had been asked to be an independent local association, but they would not accept that position, and preferred to be a branch establishment, and that being so they must be amenable to the Council.

The PRESIDENT added that if the Scottish branch had any idea of admitting press reporters to the meetings it would be entirely unconstitutional, but as he understood that was not contemplated.

Mr. BAILDON said he did not understand so. They had not as yet committed themselves to anything, and he was glad this discussion had taken place, because he was quite alive to the necessity of proceeding with very great caution in reporting the proceedings of such a body, and should do his utmost to prevent any friction arising.

The motion for receiving the report was then adopted.

JACOB BELL MEMORIAL SCHOLARSHIPS.

The Committee appointed to make the award of the Jacob Bell Memorial Scholarships for the ensuing session, subject to the approval of the Council, had reported that twenty-three candidates had presented themselves at the following centres:—Birmingham, 1; Bristol, 2; Carlisle, 1; Darlington, 2; Edinburgh, 1; Lancaster, 1; Lincoln, 2; Liverpool, 2; London, 7; Manchester, 1; Northampton, 1; Nottingham, 1; and Oxford, 1.

The envelopes bearing the mottoes of the successful candidates had been opened, and found to contain the following names:—

William Appleton Salter, of Birkenhead,
and
Alfred Mander, of Leamington.

The PRESIDENT, in moving the adoption of the report, stated that eight of the candidates had obtained sufficient marks to qualify for a scholarship, which was very gratifying. He would suggest that the mottoes of these candidates should be published for their satisfaction.

This was agreed to, and the motion carried accordingly.

The following are the mottoes of the six competitors who, as well as Messrs. Salter and Mander, obtained the number of marks qualifying for a scholarship, arranged in order of merit:—

"Qui credit posse potest."
"Vita sine litteris est mors."
"Dum spiro spero."
"Nil desperando."
"Nihil sine labore."
"Radix."

THE BRITISH PHARMACEUTICAL CONFERENCE.

The following were appointed a deputation from the Council to attend the forthcoming Conference in Manchester:—The President, Vice-President, Messrs. Atkins, Cross, Hampson, Newsholme, Radley, Richardson, Savage, Schacht, Symes and Woolley. The Editor, Sub-Editor and Secretary were also requested to attend.

THE CONVERSAZIONE.

A letter from Colonel Donelly, stating the conditions under which in future the Museum at South Kensington would be lent for the purpose of Conversazioni, was referred to the Library Committee, the Secretary stating that as far as he knew none of the conditions imposed would prevent the Society from obtaining permission to hold its Conversazione in the Museum as hitherto.

THE HANBURY MEDAL.

A report had been received from the adjudicators appointed under the provisions of the deed of settlement for the Hanbury Memorial Medal, awarding the fourth gold medal to

Brigade-Surgeon William Dymock, of Bombay,

for his researches into the natural history and chemistry of drugs. The award had been made by the President of the Chemical Society, the President of the Linnean Society, the Presidents of the Pharmaceutical Society and of the British Pharmaceutical Conference, and by Dr. William Inglis Clark, a pharmaceutical chemist nominated an adjudicator in accordance with the deed of settlement by the Presidents of the Pharmaceutical Society and of the British Pharmaceutical Conference.

The PRESIDENT moved the adoption of the report, which was unanimously agreed to.

SEPTEMBER COUNCIL MEETING.

The PRESIDENT said the members of Council woul receive, in the ordinary way, notices for a meeting in September, but it was understood that a quorum would not be formed, and, therefore, the notices should be looked upon as merely formal.

REPORT OF EXAMINATIONS.

July, 1887.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (13th)	8	7	1
„ (14th)	7	6	1
	—15	—13	—2
Minor (13th)	24	11	13
„ (14th)	26	12	14
„ (15th)	31	12	19
„ (19th)	33	14	19
„ (20th)	32	15	17
„ (21st)	30	15	15
„ (22nd)	30	11	19
	—206	—90	—116
Modified (15th)	1	1	0
	222	104	118

SCOTLAND.

	Candidates. Examined.	Passed.	Failed
Major (21st)	1	1	0
Minor (21st)	12	8	4
„ (22nd)	11	5	6
„ (26th)	13	6	7
„ (27th)	12	6	6
„ (28th)	12	3	9
	—60	—28	—32
	61	29	32

Preliminary Examination.

	Candidates. Examined.	Passed.	Failed.
12th	370	196	174

11 certificates were received in lieu of the Society's Examination.

EXAMINATIONS IN EDINBURGH.

July 21, 22, 26, 27 *and* 28, 1887.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 22nd, 26th, 27th and 28th on behalf of the Privy Council.

MAJOR EXAMINATION.

21*st.*—*One* candidate was examined, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Thomson, Isaac William.....Edinburgh.

MINOR EXAMINATION.

21*st.*—*Twelve* candidates were examined. *Four* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists :—

Abel, Peter Alexander .....Inverurie.
Airey, George Richards .....Birkdale.
Bailey, Henry .....Chesterfield.
Barclay, James Christian .....Aberdeen.
Bentley, William .....Egremont, Cumberland.
Bruce, Harvey .....Edinburgh.
Caldwell, John .....Edinburgh.
Chadwick, John Booth .....Stockton.

22*nd.*—*Eleven* candidates were examined. *Six* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists :—

Dawson, Thomas .....Currie.
Drinkwater, Weston .....Patricroft.
Eyval, Thomas Brown.....Edinburgh.
Fieldsend, Arthur .....Penistone.
Henderson, David James .....Dunbar.

26*th.*—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

England, Herbert .....Horbury.
Hindman, John .....Kirkintilloch.
Kay, Harvey George .....Aberdeen.
Macdougall, Dugald .....Greenock.
McEwan, Donald.....Dunfermline.
McKie, Robert.....Blackburn.

27*th.*—*Twelve* candidates were examined. *Six* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Napier, James .....Motherwell.
Ord, Bertram Thomas.....Gateshead.
Reid, James .....Aberdeen.
Robertson, William .....St. Andrews.
Selby, Thomas James .....Maryport.
Skinner, Donald McDougall ...Oban.

28*th.*—*Twelve* candidates were examined. *Nine* failed. The undermentioned *three* passed, and were declared qualified to be registered as Chemists and Druggists :—

Walker, Charles Herbert .....Hull.
Watt, Arthur .....Edinburgh.
Young, William Fulton .....Kilmarnock.

Erratum.—P. 96, col. 1, last line, *for* Duck, Walter George, *read* Duck, William George.

EXAMINATION PAPERS.

The following are the questions that were set for the competitions for the Council Examination Prizes, and the Medals and Certificates in the School of Pharmacy :—

THE COUNCIL EXAMINATION PRIZES.

I. PEREIRA MEDAL (SILVER); and Books of the value of £5 presented by Mr. T. H. Hills.

II. PHARMACEUTICAL SOCIETY'S MEDAL (SILVER); and Books of the value of £3, presented by Mr. T. H. Hills.

III. PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE); and Books of the value of £2, presented by Mr. T. H. Hills.

BOTANY AND MATERIA MEDICA.

Time : 10 *a.m. to* 1 *p.m.*

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

MATERIA MEDICA.

1. What is Caffeine? Enumerate the plants (with their habitats) from which it may be obtained, and describe a method of preparation.

2. Mention the active constituents of Cubebs, and describe the chemical and physical characters of each.

3. What is Kamala? Describe its appearance under the microscope, and state how you would ascertain its freedom from adulteration.

4. From what sources are the following substances derived: — Saponin, Picrotoxin, Safrol, Coumarin, Lanolin?

BOTANY.

1. Give a brief sketch of the life-history of *Claviceps purpurea*, and mention the conditions favourable to its growth.

2. What are the characteristics of the *Orchidaceæ*? Mention any products of economic value derived from plants of this order, and name the species by which they are yielded.

3. Describe the fructification of the *Mulberry*, and explain its mode of development.

4. What are *Paraphyses*? In what natural orders do they occur?

CHEMISTRY.

Time : 2 *p.m. to* 5 *p.m.*

1. The silver salt of a monobasic acid gave upon analysis the following results :—

C	36·68
H	2·19
Ag	47·16
O	13·97
	100·00

What is the formula of the acid?

2. How would you determine the percentage of magnesium carbonate in a sample of dolomite?

3. State Avogadro's law. Mention any apparent exceptions with which you are acquainted.

4. Give an account of Kekulé's graphic formula for benzene. How are aniline, benzoic acid, phenol and pyrogallic acid related to benzene?

5. How is carbonate of lithium prepared? Give its characters and tests for its purity.

6. What are the especial characteristics of the group of principles called "alkaloids?" How would you proceed to ascertain whether the root of a given plant contained an alkaloid?

SCHOOL OF PHARMACY.

BOTANY AND MATERIA MEDICA CLASS.

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Saturday, February 26, *hours from* 10 *a.m. to* 1.30 *p.m.*

1. Describe the structure, development, and chemical characteristics of Starch.

2. Give a general sketch of the structure of an Acrogenous stem.

3. What are the differences in structure between aerial and submersed leaves?

4. What are simple, apocarpous, and syncarpous fruits? Define a legume, follicle, drupe, and capsule.

5. What are the botanical and geographical sources of Podophyllum Rhizome? Describe its general characters, and enumerate its official preparations and their doses.

6. What are the botanical and geographical sources of Ammoniacum and Galbanum? Give their general and chemical characters, and enumerate their official preparations.

7. How would you distinguish the official Jalap Resin from the resins of Guaiacum, Tampico Jalap, Woody Jalap, and Scammony? Enumerate the official preparations of Jalap and Jalap Resin.

8. What are the botanical and geographical sources of

Rhubarb Root? Give its general characters, and enumerate its official preparations.

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Monday, July 25, *hours from* 10.30 *a.m. to* 2 *p.m.*

1. What is Chlorophyll? Describe its general characters, chemical composition, and uses.
2. What are Stomata, where are they found, and what functions do they perform?
3. Define the following terms:—Decussate, equitant, crenate, pinnatifid, pinnate, cordate, involucre, spathe, scape, panicle, cyme, hypogynous.
4. Describe generally the structure of the seed, and the mode of germination.
5. What official drugs are obtained from the Polygalaceæ? Describe the general characters and principal constituents of Senega Root, and enumerate its official preparations.
6. What are the botanical and geographical sources of the official Chiretta? Describe its general characters and show how it may be distinguished from spurious drugs.
7. How is Balsam of Peru obtained? What are its botanical and geographical sources, and its general and chemical characters? What is a balsam?
8. What are the botanical and geographical sources of the official Capsicum Fruit? What are its general characters, principal constituents, and official preparations?

SESSION.

SILVER MEDAL AND CERTIFICATES OF HONOUR AND MERIT.

Botany.

Tuesday, July 26, *hours from* 10 *a.m. to* 1.30 *p.m.*

1. Define the following:—Primary meristem, secondary meristem, permanent tissue.
2. Give a general sketch of the internal structure of a monocotyledonous stem.
3. Define the following terms, and give examples of plants as illustrations of each:—connate, obvolute, serrate, palmate, pedate, decompound, ligule, phyllode.
4. Define the following fruits:—drupe, etærio, lomentum, siliqua, pyxis, pome. Distinguish between true fruits and pseudocarps.
5. Describe the specimen before you in technical language, and in the proper sequence of its parts and organs.
6. Enumerate the natural orders containing British plants which afford illustrations of parietal placentation.
7. Give the essential characters of the following natural orders, and enumerate the official plants belonging to each:—Ranunculaceæ, Compositæ, Solanaceæ, Labiatæ, Polygonaceæ, Iridaceæ.

Materia Medica.

Tuesday, July 26, *hours from* 2 *p.m. to* 5 *p.m.*

1. What are the botanical and geographical sources of Coca? Describe its general characters, and mention its principal constituents and official preparations, and give their doses.
2. What are the botanical and geographical sources of the official Jaborandi? Describe its general characters, and mention its principal constituents and official preparations, and give their doses.
3. What are the botanical and geographical sources of Kousso? Describe its general characters, and mention its principal constituents and official preparations.
4. What are the botanical and geographical sources of Sumbul Root? Describe its general characters, and mention its principal constituents. In what official drugs of the Umbelliferæ is umbelliferone found?
5. What are the botanical and geographical sources of Copaiba? Describe its general and chemical characters. Mention the substances used to adulterate it, and the means of detecting such adulterations.
6. What official drugs are derived from the Piperaceæ? What are the botanical and geographical sources of Cubebs? Describe their general characters, and show how they may be distinguished from spurious fruits.
7. What is the botanical source of the official Filix Mas? Describe its general characters. Mention its principal constituents, and show how it may be distinguished from other allied Fern rhizomes.

CHEMISTRY AND CHEMICAL PHYSICS CLASS.

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES.

March 1. *Time allowed*—10 *a.m. to* 2 *p.m.*

1. Enunciate the law of Boyle, and show how it may be experimentally demonstrated.
2. Describe two methods by which hydrogen may be prepared from water, Upon what experimental facts is the formula H_2O based?
3. Starting with nitric acid, show by what reactions nitrous oxide may be obtained. What volume of this gas at 15° C. and 740 mm. pressure can be prepared from 120 grams of nitric acid?
4. State the sources of ammonia. What reactions does ammonia gas undergo with chlorine, with oxygen, and when strongly heated?
5. Explain what is meant by "electrolysis." Describe the result of electrolysing a solution of potassium iodide.
6. How is acetic ether prepared? Explain the reactions which occur in the process of the British Pharmacopœia. How may alcohol be obtained from the compound?

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES.

July 27. *Time allowed*—10 *a.m. to* 2 *p.m.*

1. Describe the ordinary process for obtaining the metal aluminium, and express by equations the chemical reactions that are involved. Explain what constitutes the special difficulty in the isolation of the metal from its oxide.
2. Formulate the action of tin, copper, and zinc on concentrated and on diluted sulphuric acid.
3. Explain the chemical changes that occur during the preparation of Liquor Ferri Pernitratis.
4. Describe three methods of generating an electric current. How may the existence of the current be detected?
5. Describe the characteristics of the groups of hydrocarbons known respectively as paraffins, terpenes, and benzenes.
6. Describe the experiments you would make in order to determine the "equivalent" of zinc. How has its molecular weight been arrived at?

SESSION.

SILVER MEDAL AND CERTIFICATES.

Part I.—Physics.

July 28. *Time allowed*—10 *a.m. to* 1 *p.m.*

1. Describe the plan you would adopt to determine the solubility of a solid in water at different temperatures. How may the series of results be best recorded?
2. What is the "mechanical equivalent of heat?" By whom has it been determined? Express the result in degrees centigrade, kilograms and metres.
3. Describe in detail one form of "secondary battery," giving a full account of the chemical and electrical changes involved.
4. How may the "latent heat" of ether vapour be determined?
5. Give an account of the "Fraunhofer lines." Describe an arrangement by which their formation may be demonstrated.

Part II.—Chemistry.

July 28. *Time allowed*—2 *p.m. to* 5 *p.m.*

1. In a recent determination of the atomic weight of silicon it was found, as the aggregate result of many experiments, that 95·5236 grams of silicon tetrabromide yielded 16·568 grams of silicon dioxide

$$(SiBr_4 + 2H_2O = SiO_2 + 4HBr).$$

Calculate the atomic weight.

2. Give an account of the relationship of arsenic and antimony. Discuss the evidence for regarding them as non-metals.

3. How is "dialysed iron" prepared? Of what does it consist? How does it differ in its reactions from soluble ferric salts?

4. Describe the reactions of paraffinoid aldehydes, and compare them with those of benzenoid aldehydes.

5. Give a short account of the vegetable alkaloids. How may the molecular weight of a non-volatile alkaloid be determined?

CLASS OF PRACTICAL CHEMISTRY.

July 18 *and* 19, 1887. *Hours*—10 *a.m. to* 5 *p.m. each day.*

(*Books and Memoranda permitted.*)

Standard number of Marks, 100.

FIRST DAY.

1. Make a qualitative analysis of the accompanying "Lotion," and state your results.

2. Ascertain the percentage of quinine in the "Citrate of Iron and Quinine" supplied to you.

SECOND DAY.

3. What saline substances are present in the "Medicine?"

4. How much calomel is present in the "Pill" handed to you?

NOTE.—*Manipulation as well as results will be scrutinized.*

British Medical Association.

FIFTY-FIFTH ANNUAL MEETING.

On Tuesday the annual meeting of the British Medical Association was commenced in Trinity College, Dublin. The first general meeting of the members was held at half-past eleven in the Examination Hall; there was a good attendance. The chair was taken by the outgoing President, Dr. W. Withers Moore, who in a brief speech, introduced the President for the coming year, Dr. John T. Banks, Regius Professor of Physic in the University of Dublin, in whose favour he then vacated the chair.

A vote of thanks to the retiring President, moved by Dr. Wheelhouse and seconded by Sir Thomas Crawford, was carried unanimously.

The report of the Council and financial statement were then submitted. The report stated that the financial condition of the Association was highly satisfactory. The total revenue during the last year was £25,385 2*s.* 10*d.*, whilst the expenditure was £21,395 15*s.* 6*d.*, leaving a surplus balance of £3989 7*s.* 4*d.* The invested capital of the Association amounted at present to £17,566. The Parliamentary Bills Committee had had under its consideration the Lunacy Acts Amendment Bill, the question of the abolition of relative rank and its consequences to army medical officers, and the Pharmacy Acts Amendment Bill in so far as it seemed to concern the medical profession and the public, as well as other subjects. In accordance with a resolution passed at the last annual meeting steps had been taken to ascertain the feeling of the branches in regard to the payment of the travelling expenses of representatives on the Council of the Association when attending meetings in London. Sixteen branches, numbering 2746 members, were in favour of first-class fares being paid out of the funds of the Association; eight branches, representing a total of 1878 members, were in favour of payment of such expenses out of each branch's own funds; and two branches, numbering 180 members, were in favour of part-payment by the Association for any distance beyond 100 miles from the metropolis. The vote of one branch of 103 members was doubtful. The total number of members who voted as represented by the branches, was 4627, the number of members in branches who had not yet voted and of members who were not in branches or who resided abroad, was 6480. The Council had accepted a recommendation of the Journal and Finance Committee on the principle of paying the members of the Council, and had adopted a resolution to the effect that it is essential for the welfare of the Association that a sum of £2000 should be invested out of the surplus every year, and that, this annual investment having been made, the payment of the expenses of members of the Council should be by fees as follows—members residing within 100 miles of place of meeting, one guinea; over 100 miles, two guineas; over 250 miles, three guineas; over 400 miles, five guineas.

The adoption of the report was moved by Sir B. Walter Foster, President of the Council, and seconded by Dr. Macnamara.

An amendment to the effect that the paragraph relative to the payment of expenses should be omitted was moved by Dr. William Strange, and eventually carried, and the report was adopted with this alteration.

Mr. Ernest Hart moved the adoption of the report of the Parliamentary Bills Committee, and in the course of his remarks said that with respect to the Pharmacy Acts Bill the Association was greatly indebted to Sir Walter Foster for his promptitude in bringing forward amendments for the protection of the medical profession from any possible encroachments such as were threatened by that Bill on the curative functions of the medical profession. As originally framed that Bill threatened to give indirectly powers to chemists to practise and prescribe. He had had a correspondence with the General Medical Council on the subject; and the Association was much indebted to the Chairman of the General Medical Council for having transgressed formalities and pressed the views which had been put before him on the part of the Association.

The motion having been seconded, an amendment was moved by Sir Thomas Crawford to the effect that a paragraph relating to relative rank of medical men in the army should be referred back to the Committee. After a somewhat animated discussion, the amendment was carried, and the report, with this alteration, was adopted.

The general meeting was shortly afterwards adjourned until the evening.

At half-past eight in the evening the members reassembled in the Dining Hall of the College, when the newly elected President, Dr. J. T. Banks, proceeded to deliver an address, from which the following passages are taken:—

The President's Address.

After referring to the previous visit of the British Medical Association to Dublin, twenty years ago, and to some of the changes that had taken place since then, the President proceeded to give a historical sketch of the connection of medicine with the ancient University of Dublin, which stands an enduring monument of the wise and far seeing Queen Elizabeth, who founded it nearly three centuries ago. Seven years after the foundation of the University it is recorded in the College Register that a concordatum of £40 yearly was granted by the Government for a "physitian's pay," and this is supposed to be the origin of the Professorship of Physic. It was not, however, until 1618 that medicine became an integral part of the University teaching, for then it was ordered that one of the Fellows should be a Professor of Physic. "Volumus insuper ut jurista et medicus post secundum professionis annum semel quovis termino in sua facultate prelegant."

This quotation from the College Register shows that medicine was then placed side by side with law, after the example of Oxford and Cambridge, the scheme of which had for their model the ancient University of Paris. The statutes for regulating the examinations were given in 1570, and comparing them with those of Cambridge, it is manifest they were formed on the model of her elder sister. This is what might have been reasonably anticipated, as for thirty-six years from its foundation the University of Dublin was ruled by Cambridge men. The examinations at Cambridge were conducted *vivâ voce* in Latin. For the degree of M.B. the candidate had to keep one act and one opponency; the man who kept the act was called the respondent; the man who kept the opponency was termed the opponent. The Regius Professor presided at the act, and himself brought arguments, etc., and questioned both the respondent and opponent. At the end of an hour he pronounced satisfaction or dissatisfaction with the performances. The candidate for M.B. must have studied five complete years, and in the ancient statutes it was ordered—"Anatomias tres aut ad minimum duas videbit." For the degree of M.D. the candidate had to keep two acts and one opponency, and five years must have expired from taking the M.B. The form of disputation in the schools was adopted in the Dublin University, and it was required that the student in medicine should be a Master of Arts, and have spent seven years, after taking his master's degree, in the diligent study of medicine; he must have been present at the dissection of three bodies, and also have "cured" four cases of different diseases. For a candidate to bring proof that he had treated successfully cases before he received the "Licentia practicandi" seems to us moderns an extraordinary rule. The President then said, It may not be profitless to glance at these rules and regulations of byegone days, particularly referring to the duration of study. It is interesting to notice that, since the law was enacted that the Professorship of Physic should be filled by a Fellow, only three have been found qualified. One of them, Dr. John Stearne, induced the Provost and Senior Fellows to assign a building, which was called Trinity Hall, for the use of the Fraternity of Physicians; and he became their first president. The third was Dr. Whitley Stokes, a man of profound learning and great energy, to whom we owe a museum, and also our botanic garden. From the date of the election of the first Professor of Physic, John Temple (1618), down to the present day, the University has ever been the fond and faithful nursing mother of medicine, always insisting on her graduates in medicine being also graduates in arts, thus placing medicine in its proper place, on a par with divinity and law. Speaking of the advantage of university training, I may quote the words of Blackmore, physician and poet, who wrote in the 16th century: "I look on myself to have great obligations to the studies of logic and metaphysics, wherein I was carefully instructed in the university, which improve and advance our reasoning faculties, teach us to think clearly, and thereby fit a man for any kind of business or profession." He probably remembered Bacon's words: "Medicina autem in philosophia non fundata, res infirma est." It may be asked why our profession is sometimes disparaged, in comparison with divinity and law; and I think an answer can be found in the fact that a university education is the rule in the learned sister professions, and that in ours a considerable number obtain a licence to practise the healing art without passing through the portals of a university or receiving an education equivalent to that of a university. The well-abused Medical Council, over which my friend Sir Henry Acland so long presided with such signal ability and wisdom, has never ceased its exertions to improve the general as well as the professional education of candidates for the medical profession, and through its well-directed efforts the social and scientific position of medicine has undoubtedly been raised. At an early meeting of the Medical Council Mr. Teale directed attention to the subject, insisting on a large and liberal education being the best foundation for technical training, whether the physician practises among the rich or the poor. One of the "recommendations" of the Medical Council is that "no university in the United Kingdom should confer any degree in medicine or surgery upon candidates who have not graduated in arts, or who have not passed, after due course of education, examinations such as are *bonâ fide* academically equivalent to a degree in arts." The fault-finders of the Council seem to be unaware that the Council cannot issue mandatory orders; it can only recommend, and look to gentle suasion as a means to have its recommendations adopted. The President then passed on to speak of the College of Physicians, which was called into existence by the University, with which to this day it is intimately connected. The earliest notice of the College of Physicians is found in a letter from Charles I. to Viscount Falkland, the date of which is 1626. He commences by referring to the zeal his father had to reduce the kingdom of Ireland to civility, and to a uniform manner of government with the realm of England. "We therefore," he proceeds to say, "in imitation of so royal an example, have now taken into our consideration that the establishing and practice of learning and humane sciences is not a little available thereto, and amongst others that laudable and necessary art of physic the practice whereof, as we are informed, is daily abased in that one kingdom by wandering and ignorant empyrics, who for want of restraint do so much abound, to the daily impairing of the health and hazarding of the lives of our subjects." The King then directs that a College Society and Corporation of Physicians be "created" according to the rules and form of the charter heretofore granted to the physicians of the city of London. From this document it appears that the College of Physicians in Ireland was established on the lines of the London college, as the rules to regulate graduation in medicine in the University of Dublin were framed nearly in conformity with those of Cambridge. In 1637 a physician named De Lane wrote to the famous Archbishop Usher saying, "I suppose it hath been an error all this time to neglect the faculties of law and physic and attend to one poor College of Divines." Soon after the incorporation of the Physicians Trinity Hall was granted to them by the University, with the strange condition that they were to meet and consult without fees upon the best means for the recovery of the Provost and Fellows whenever they or any of them may happen to be diseased. The College of Physicians then consisted of fourteen Fellows, including the President, a rather cumberous consultation, but limited when compared to what it would be now that the College has attained its present dimensions. Second on the list of Fellows in the original roll stands the name of Sir William Petty, who, taking him all in all, was not only the most remarkable man belonging to our College of Physicians, but unquestionably one of the most extraordinary men who ever played a part on the stage of public life in Ireland. In the year 1699 the charter of Charles I. was surrendered by the College of Physicians, and a new one was granted by King William and Queen Mary, and henceforth our College became the King and Queen's College of Physicians, and Sir Patrick Dun, who accompanied the Prince of Orange to Ireland, and was in attendance on him at the battle of the Boyne, was chosen its first President. After referring to the Dublin hospitals and medical schools and other subjects, the President, whilst speaking of the Royal University, incidentally alluded to the education of women. The University, he said, is bound to admit women; the mandatory words are: "The University created by this our charter shall have power to examine for, and, after examination, to confer, all such degrees and other distinctions on every person, male or female," etc. With

respect to the expediency of women entering the medical profession, the President said, this is a question which I abstain from discussing. The Royal University has no discretion in the matter, and our Colleges of Physicians and Surgeons have voluntarily thrown open their doors and afforded them every possible facility. There is a great field open for medical women in India, where millions of their own sex decline to admit the ministrations of men; and to the want which exists in this part of Her Majesty's dominions Lady Dufferin, the wife of the distinguished Viceroy, who is also Chancellor of our Royal University, has kindly and wisely called attention. In framing the medical curriculum for the young university, the medical members of the Senate aimed at a high standard, and I confidently affirm that the examinations, in point of extent and thoroughness, are not inferior to those of any of the old licensing bodies.

At the close of the address a hearty vote of thanks was accorded to the President.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A special general meeting of this Society was held at the new premises in Fitzalan Square, on Wednesday evening, July 27, for the purpose of considering the advisability of revising the rules.

The President (Mr. J. M. Furness) explained the action taken by the Council in the matter, saying that, after careful deliberation, that body had decided to make two recommendations to the members generally. The first was that the present rules be rescinded in their entirety, and the second that new rules, which would be placed before them, be adopted in their place.

These recommendations being put as formal resolutions were agreed to by the meeting, after due deliberation and explanation.

The points of difference between the new rules and old are comparatively unimportant, being for the most part in the directions of greater simplicity and clearness. The chief deviations concern the amount of subscription, the election of Council and officers, and the time of the annual general meeting. This has been altered from May to September, and, seeing that the real work of the session will not have commenced next September, it was agreed that the annual general meeting to be held then under the new regulations should be merely formal, to confirm the proceedings of the May meeting.

This concluded the business of the evening.

Parliamentary and Law Proceedings.

Poisoning through a Mistake in Dispensing.

On Saturday, July 30, Mr. J. B. Edge, District Coroner, held an inquiry at Crompton Fold, Breightmet, Bolton, touching the death of Miss Louisa Briggs, daughter of the late Mr. C. Briggs, J.P., which took place under distressing circumstances on Friday morning from the effects of poison.

Mr. W. W. Cannon, jun., solicitor, watched the proceedings on behalf of Mr. T. R. Pownall, who had compounded the medicine for the deceased.

Mr. Cannon, at the outset, on behalf of Mr. Pownall, expressed that gentleman's regret for the lamentable occurrence, and intimated that he also wished to offer to the Coroner and Jury the fullest information in his power, and to tender his evidence and that of his assistant, Mr. Woodville Lawton.

The Coroner: He is bound to give the amplest explanation.

Mr. Cannon: He is prepared to do so.

The first witness called was Mr. Arthur Bailey, Wood Street, who said the deceased was his wife's sister. She was fifty-eight years of age, and daughter of the late Mr. Christopher Briggs. He last saw her alive on Monday, when she was in very good health and spirits. She had been abroad in company with one of his daughters, and had returned wonderfully well. He knew nothing of the occurrence.

Agnes Finney, housemaid at Crompton Fold, said that part of her duty was to attend to Miss Briggs. A little after seven on Friday morning witness took a cup of tea upstairs to her mistress, who shortly afterwards went to another room to see a lady friend who was staying at the house. About twenty minutes past eight deceased rang her bell twice, and witness upon going to her room found her lying on the bed ready to come downstairs. She said to witness, "I am very ill; give me some brandy; I have had some fresh medicine, and it does not suit me." She obtained a little brandy, and deceased, after drinking, threw herself on the bed again. She did not speak after that, and appeared to lose consciousness. Witness asked her if she must fetch Mrs. Tait, the lady friend mentioned, but she did not speak. She went for that lady, who upon seeing deceased thought she had been seized with an apoplectic fit. On the suggestion of witness, Dr. Garstang was sent for, and also Mrs. Bailey. The doctor arrived in about a quarter of an hour, deceased being still alive. She died a little after ten o'clock the same morning without recovering consciousness. Witness knew she had had some fresh medicine the previous evening from the shop of Mr. Pownall, St. George's Road. She had fetched medicine at different times for Miss Briggs. There was another bottle in the room (which the Coroner marked "b") which had contained medicine similar to what the bottle marked "a" should have contained. (Bottles here produced.)

Dr. E. M. Garstang, Bolton, said this was the first time he had been called in. A coachman came for him about nine o'clock on Friday morning, and he arrived at the house at twenty-five minutes past nine. He found deceased lying upon her bed, partially dressed, and perfectly unconscious. She was convulsive, the eyes were perfectly insensible, and he also noticed severe twitchings of the body and limbs. He had heard that she had suffered from some mischief that might cause apoplexy, and he accordingly asked for the medicine. The bottle marked "a" was given to him, and there was a very suspicious smell came from it, similar to that of bitter almonds. This threw a new light on the matter, and he suspected the death must have been caused by the medicine. The symptoms were consistent with hydrocyanic acid. He used such remedies as he thought best in the time, but she died in about forty minutes from the time he saw her. He took charge of both bottles, and in company with Dr. Gillibrand delivered them to Dr. Sergeant, who sealed them in their presence. On Friday afternoon witness along with Drs. Sergeant and Gillibrand made a *post-mortem* examination of the body. He found the body was well nourished, there being no external marks beyond those of decomposition. There was a small deposit of fat on the heart, which was otherwise healthy. The valves of the heart were perfectly healthy. The left ventricle was firmly contracted, the right one relaxed and contained a small quantity of dark fluid blood. The lungs were fairly healthy, as were all the internal organs. They removed the contents of the stomach, and placed them in a sealed jar, which was taken away by Dr. Sergeant. The odour of bitter almonds was here plainly perceivable. On examining the brain the membranes were found to be somewhat congested. The brain itself was somewhat pale but healthy, the paleness being in such a condition as to be caused by poisoning. In his opinion he had no hesitation in saying that death was caused by poisoning with hydrocyanic acid. He asked for the prescription of the medicine, and amongst a number of others the one with

the number which corresponded with the number on the bottle was given to him by Miss Finney. There was no mention of hydrocyanic acid on the prescription, but there was some diluted hydrochloric acid ordered. He should not consider hydrochloric acid to be a poison, and it would only be an irritant poison if taken in large quantities.

By a Juryman: One dose of the medicine was taken, as indicated by the mark on the bottle.

Dr. Sergeant, Medical Officer of Health, stated that he was present at the *post-mortem* examination. He entirely agreed with the evidence of the previous witness. He perceived the odour spoken of in the stomach, and also the colour of the brain. He took the jar containing the contents of the stomach with him. He received from Drs. Garstang and Gillibrand the two bottles, and also a prescription. Considering the importance of the case he thought it desirable to consult with Mr. John Collins, public analyst, and he did so. The bottle "b" contained about half a spoonful of fluid, and witness and Mr. Collins tested it for hydrocyanic acid, but did not find any. They then tested the bottle marked "a," and it had the peculiar smell of bitter almonds strongly marked. The poison of hydrocyanic acid was in the bottle in combination with bicarbonate of potash. The acid would combine with the potassium when mixed, and effervescence would take place to a slight extent. If hydrochloric acid had been mixed with carbonate of potassium the effervescence would have been more marked. They also tested the contents of the stomach, and the presence of hydrocyanic acid was clearly detected. In his opinion the deceased died from hydrocyanic acid. It was usual to keep poisons in different coloured bottles, fluted, and clearly marked poison. Hydrochloric acid was not a poison unless taken in very large quantities.

Margaret Hutton Turnbull, lady companion to Miss Briggs, deposed to fetching the bottle of medicine from Mr. Pownall's shop on Thursday afternoon. Mr. Pownall gave it to her.

By Mr. Cannon: She was in a hurry. She asked if it could be made up in a quarter of an hour, and he said it could. He did not ask her for half an hour to get it ready. It was made up in about ten minutes.

Mr. Pownall having been formally cautioned by the Coroner, upon the advice of Mr. Cannon, tendered his evidence. He said he had been in business as a chemist about twenty years in St. George's Road, and had made up medicine according to the prescription on several occasions. He had a copy of the prescription entered in prescription book in the ordinary way. [Book produced. In the prescription the term "hydrochloric" was contracted, but the Coroner said that was a point of no importance.] On Thursday afternoon Miss Turnbull brought the bottle "a" to be dispensed according to the prescription, similar to that made on previous occasions. As far as his memory served him, he asked her to give him half an hour to make it up. She said she could not allow him so long a time, and would be back in about ten minutes. He promised her to get it ready in that time. She left the shop, there being other customers in at the time. He told his eldest apprentice, Woodville Lawton, to get a clean measure and to find the prescription in the book, and also to obtain other things necessary in the dispensing of the medicine. Witness weighed out the bicarbonate of potash, placed some water along with it to dissolve it, and added what he believed to be hydrochloric acid. There were only two drugs compounded. He filled the bottle up with water, and had just finished dispensing when Miss Turnbull called. There were only two bottles on the counter used in the mixing up of the medicine. He knew the mixture had to effervesce, and the mixture in question effervesced as usual. He did not notice whether it effervesced more than usual. The apprentice removed the bottles, and did not make any remark to witness. The bottle containing hydrocyanic acid was a darkish blue colour. It had no distinguishing marks upon it with the exception of a label containing the word "poison," and also the name of the acid. The bottles were a little different in size, and were not kept on the same shelf. The one containing hydrochloric acid was, he believed, a white one labelled "poison." The hydrocyanic acid was kept in a coloured bottle for the sake of preserving its strength. He did not look at the bottles on account of being in a hurry, and took them as they were handed down to him. Lawton had been with him three years, and was nineteen years of age. The bottles were about two yards apart. Witness could give no explanation as to how he got hold of the wrong bottle; it was purely a mistake.

By Col. Bailey: He did not remember saying to Mr. Hall that the medicine did not effervesce as it ought to have done. The poisons were not kept separate from the other medicines, but were mixed up with them.

By Mr. Cannon: It was not usual for him to mix up medicines in a hurry. If he had had plenty of time to do it he would not have asked anyone to assist him. It was on account of being in a hurry that he called the assistance of his apprentice. He examined the prescription from beginning to end.

By the Foreman: There were two or three people in the shop at the time, and much conversation going on.

By Mr. Holland: The apprentice reached down the bottles merely from a reference to the prescription book. He had not had them before that day, neither did he detect the smell when he used the one containing the hydrocyanic acid. Mr. Mitchell dispensed in his absence.

Woodville Lawton, 226, Buckley Lane, Farnworth, said he was an apprentice to Mr. Pownall. He was not in the shop when Miss Turnbull called. He was in another room, and Mr. Pownall told him to get a clean measure to mix some medicine for Miss Briggs, and also to look into the prescription book. He saw the words "pot. bicarb." on the prescription, which he understood, and he got the bottle to which this referred. He glanced at the book and read what he thought to be diluted hydrocyanic acid, though at the time the writing was somewhat obscured by the shadow of the window blind. Thus being under the impression that hydrocyanic acid was wanted he reached the bottle down. He did not remember having seen the prescription before. The bottle containing the hydrocyanic acid was kept in a cupboard and the other on a shelf. [Bottles here produced.] He noticed that the medicine had to be taken internally, and he knew that this acid was a poison.

By Mr. Briggs: Mr. Pownall was supposed to read the labels on the bottles before using them.

By Mr. Cannon: Mr. Pownall had of late suffered from a weak action of the heart, which caused nervous excitement, and this always troubled him when he was flurried.

The Coroner: This is really what it comes to. Lawton believed that hydrocyanic acid was wanted and he got it. The whole of the system in Mr. Pownall's shop shows a lamentable want of care in dealing with poisons.

By Mr. Briggs: If the poisons had been kept in some particular kind of bottle, Mr. Pownall, the moment he had received them into his hands, would have known them to be poisons, although he (witness) had made a mistake.

The evidence being completed, the Coroner proceeded to sum up. He said it appeared to him that they had got to the real cause of the lamentable occurrence, and one could not help saying it was most sad. From the evidence of Lawton, it seemed that Miss Turnbull called for the purpose of having the medicine mixed up in a short time. Mr. Pownall having prepared the same mixture some half-dozen times was reasonably acquainted with it. Mr. Pownall said he was very busy, and wanted half an hour for the purpose. He (the Coroner) was

bound to say that as Mr. Pownall was daily dealing with deadly poisons, he had no right to be hurried in mixing those prescriptions, and he should take time and insist upon that with his customers. He was undoubtedly blameable, and it was a matter that he ought to rectify at once. Then Lawton got down the bottle containing hydrocyanic acid, and tried to excuse himself for that by saying that the window blind cast a shadow on the book. He admitted handing the bottle to Mr. Pownall without saying anything. That was a fearful state of things ; he might poison half a town that way. He (the Coroner) only hoped and trusted that that was not a common occurrence in Bolton. The only thing that could be said about him was that he was a young man aged 19. Anything more careless he thought they could scarcely conceive. He, merely satisfied with a glance at the prescription book, fetched the deadly poison and planted it on the counter without a word. The only excuse they could offer for him was his youth. With regard to Mr. Pownall, he was a man who had been for twenty years in the habit of mixing drugs. He admitted, and it was astonishing that he should do so, that he took the two bottles handed to him by the apprentice, and made up the deadly mixture without even referring to the label. That was really the case ; first the blunder and carelessness exhibited by Lawton in getting the bottle through misreading the prescription, and secondly, the great mistake of Mr. Pownall compounding this without himself scrutinizing the bottle. What were they to think of Mr. Pownall making a mistake in his own shop between a large bottle ocntaining a deadly poison and a small bottle that contained something comparatively unpoisonous ? With regard to the business transacted in the shop, it was, to his mind, most astonishing. Mr. Pownall admitted that poisonous drugs were kept mixed up with drugs which were perfectly innocuous. And that very poison itself was not put into a coloured bottle for the sake of preventing it being misused, but for preventing its strength from escaping. They could judge for themselves what carelessness had been exhibited. When a man engaged in an occupation like that, he was bound to use all reasonable care and skill, and if he did not, he was liable to an action by the relatives of the person injured. He was not responsible criminally—and that was what the Jury would have to bear in mind—for a mere error of judgment, a mere slight negligence, or for some want of care. He was only responsible criminally for the death of an individual if he had been guilty of what the law considered gross negligence, in other words, a kind of recklessness in what he had done. There was no doubt that Lawton was guilty of want of care, and also Mr. Pownall was guilty of the same. It was for the Jury to say whether they thought one or other of them were liable in the criminal sense he had pointed out. If they did, then their verdict must be one of manslaughter. But if, on the other hand, they thought it was mere hurry not amounting to recklessness, then they must say it was death by misadventure.

The Jury then retired, and after half an hour's absence, the foreman intimated that they had come to the conclusion that Miss Briggs was poisoned by misadventure, caused by great negligence on the part of Mr. Pownall and his apprentice. He also expressed the desire of the Jury that they should be censured by the Coroner.

The Coroner said the Jury were of opinion, in which he entirely concurred, that Mr. Pownall and his apprentice had been guilty of very great negligence, almost amounting to gross negligence, in the compounding of the medicine. Addressing Lawton he said: There is only one plea that can be made on your behalf, and that is your youth. I cannot conceive anything more grossly negligent than the dealing with the deadly poison in the way you dealt with it. The very fact that you were asked to hand down the poison of that nature ought to cause you to be careful. I do not know why you did not call your master's attention to it that it was a poison. I hope you will be extremely careful in the future. You might cause a vast amount of sorrow and mischief. Speaking to Mr. Pownall, the Coroner said: I cannot understand why you, an experienced chemist, dealing with those bottles, did not at once detect the deadly poison. You must have taken up these bottles in the full faith that the correct ones were handed to you, and you do not seem to have taken the smallest care in ascertaining the nature of the compound. I am quite sure the Jury must have considered your long experience as a chemist in coming to the conclusion that they have done. It is a most serious case. Lives of people are not to be imperilled by carelessness on the part of chemists. I only hope you will be extremely careful in the future—*Bolton Evening News.*

Trade Mark Case.

At the instance of the Apollinaris Company, Limited, Mr. Justice Chitty, on July 29, granted an interim injunction against the agents of Kronthal Water, restraining them, their servants, and agents from using the word "Apollinis" upon any mineral water.

Mr. Romer, Q.C., and Mr. J. Cutler, appeared for the Apollinaris Company ; Mr. Aston, Q.C. and Mr. Morshead appeared for the defendants.

It appeared from the evidence that Kronthal Water was originally sold in this country under the name Kronthal, but that recently the defendants adopted a label on which the water was described as coming from the Apollinis Spring. The defendents failed to justify their employment of the word "Apollinis."

The Court held that the word "Apollinis" was an infringement of the plaintiffs' registered trade mark "Apollinaris."

Correspondence.

An Effect of Dry Weather.

Sir,—As an argument that the sale of *all* drugs should be in skilled hands may I relate a somewhat droll fact of to-day's experience ?

A lady bought from a herbalist 6 ounces of dandelion root, and used it in a brew of home-made "beer," which, when tried, proved just the reverse of a stimulant, very distressing symptoms resulting to several partakers of the beverage. A fresh sample of the root was procured and brought to me for examination. A glance showed it to be ipecac, and further inquiry brought out the fact that six weeks ago 7 pounds of dandelion root was ordered, and invoiced from a wholesale druggist who had by mistake sent out 7 pounds rad. ipecac. It was correctly labelled, but herbalists apparently do not read labels, and the seller, a respectable woman of over twenty years' experience in handling simples, did not include this in her materia medica, but explained to her customers that dandelion root was small in size this year owing to the dry weather. To me she grumbled about the inferiority of the sample, and thought it dear at its cost of 6*d.* per pound.

It would be interesting if we could trace the history of the sundry packets of this "dandelion root" vended at 2*d.* per ounce during the past six weeks. Imagination can fill it in.

I fancy somebody will have to pay for the "beer," but that is not my business.

Scarborough. John Whitfield.

Notice.—A manuscript on a pharmaceutical subject has been received, with no other clue as to whence it has come than the postmark "N.W." on the envelope.

W. S. (who should have sent his name).—See a paper by Messrs. Eastes and Ince, *Pharm. Journ.*, [3], xvi., 682.

F. C. F.—Further information respecting the preparation of butyric acid may be found in Watts's Dictionary or any good manual of chemistry.

S. M.—Should consult a solicitor.

Communications, Letters, etc., have been received from Messrs. Méhu, Braithwaite, Benger, Wilson, Woolley, A. H. B., Perplexed Widow.

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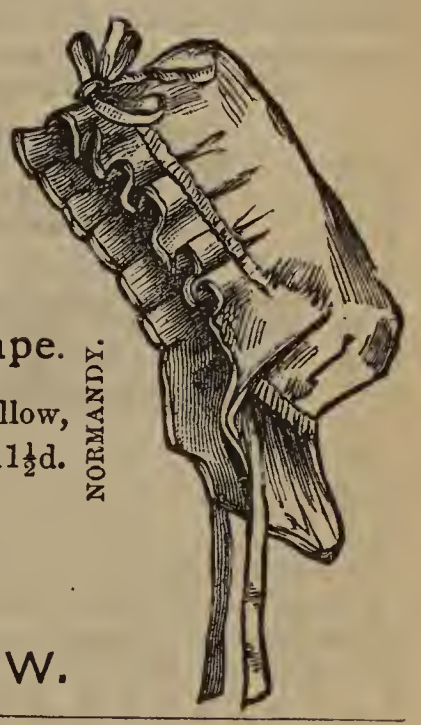

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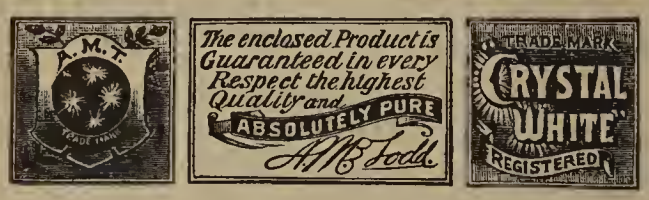

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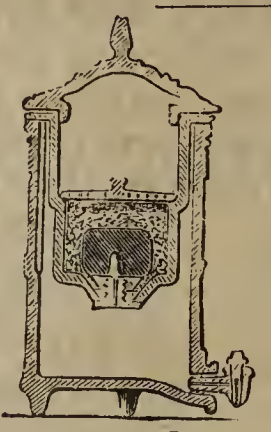

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Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

All Hospital appointments are open to students without extra charge.

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(COUNCIL MEDALLIST OF THE PHARMACEUTICAL SOCIETY)

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All at their first attempt.

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The following have passed from this School:—

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Mr. J. W. Lang, Southport

Minor.

Mr. H. Aspinall, Liverpool	Mr. T. Clough, Liverpool
,, W. Bentley, Lancaster	,, C. E. Hanslow, Woodford
,, T. Birkett, Workingt'n	
,, E. G. Bond, Liverpool	,, E. Jones, Portmadoc
,, T. W. Carr, Knaresbro'	,, J. E. Jones, St. Asaph
,, G. M. Gass, Whitehaven	,, B. Phillips, St. Clears
	,, A. Stephen, Liverpool

Preliminary.

Mr. J. H. Griffiths, Little Brighton	Mr. J. H. Marples, Birk'h'd
,, A. A. Jones, Liverpool	,, H. E. Sawden, Liverp'l
	,, W.H.Warhurst,Liverpl

Apothecaries' Hall—Mr. J. W. Whitely, Gainsborough.

Jacob Bell Scholarship—Mr. W. A. Salter, Birkenhead (one of the Bell scholars for next session), is a member of the Chemistry and Pharmacy class.

NOTE.—*All that have been sent in for (a) the Major, (b) the Preliminary, and (c) the Apothecaries Hall during this session have passed.*

The next session will commence on Monday, Sept. 5, 1887. Those desirous of joining the October or December Classes should enter at once. New Syllabus, with full particulars of Classes, Fees, &c., sent free on application.

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ESTABLISHED 1ST OCTOBER, 1868.

THE TWENTIETH SESSION, 1887-8,
Will commence on the 12th September.

A class of Students not going up in July will meet on the 18th August for October; there will be room for two or three more to join them.

For Fees, &c., apply to W. BAXTER, Secretary.

× × × × ×

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× × × × ×

THE

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At the Examinations held in London in July, **4** Major Candidates from this School presented themselves. **All** passed, viz.:—

Mr. Brumwell.
„ Coleman.
Mr. Davis.
„ Wokes.

Out of **25** Minor Candidates who presented themselves in July from this school the following **21** passed:—

Mr. F. G. Acton.
„ W. Batchelor.
„ H. W. Brassington.
„ E. M. Carruthers.
„ A. W. Cox.
„ W. G. Duck.
„ H. Ferryman.
„ R. Glendinning.
„ J. H. B. Green.
„ J. E. B. Grice.
Mr. A. W. Hanson.
„ R. H. Jackson.
„ J. Jenkins.
„ W. B. Lister.
„ J. Metherell.
„ H. J. Owen.
„ W. A. Shera.
„ J. H. Stewart.
„ J. R. Strick.
„ H. O. Thomas.
Mr. J. Wilkes.

The next session will commence on Thursday, September 1st. Fee to the October examinations, six guineas; to December ten guineas. For Prospectus apply to

Mr. JOHN WOODLAND, 173, Marylebone Rd., London, N.W.

Portman School of Pharmacy.

156, MARYLEBONE ROAD
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The next term commences August 8th. Fee till the October Examination, £5 5s.

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The next Session will commence on Monday, September 5th.

FEES. { To the October Examination ... ... £6 6s.
„ December „ ... ... £9 9s.
12 Months' Course (Minor and Major), £15 15s.
Preliminary, £1 1s. per month.

At the recent Examinations held in London, **37** Students of this College were successful in passing the Minor and Major. For names, see advertisement last week.

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Have been organised, by which gentlemen engaged during the day, and unable to leave business to attend the Day Lectures, may be prepared IN THE EVENING for the various examinations of the Pharmaceutical Society.

Practical Analysis, 7 till 8; Class, 8 till 9.

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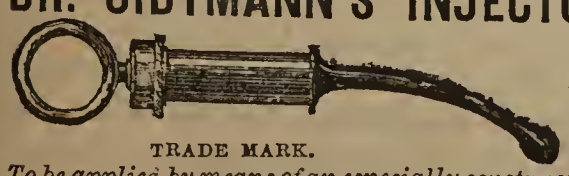

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 894.] SATURDAY, AUGUST 13, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 22nd to September 5th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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OF THE

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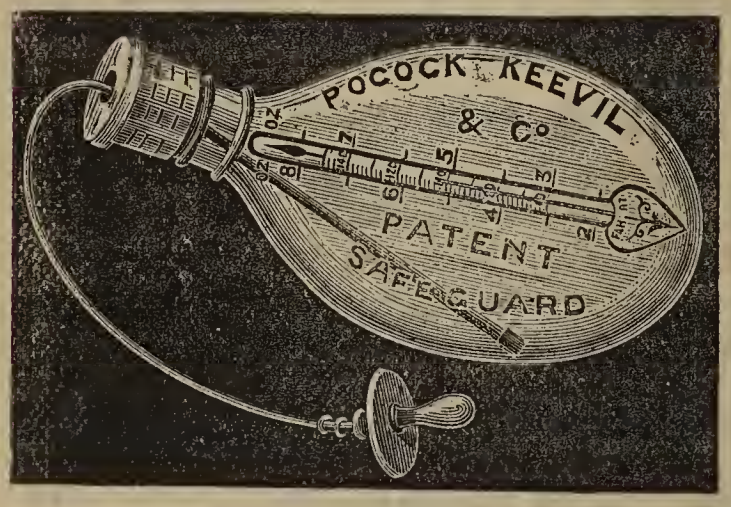

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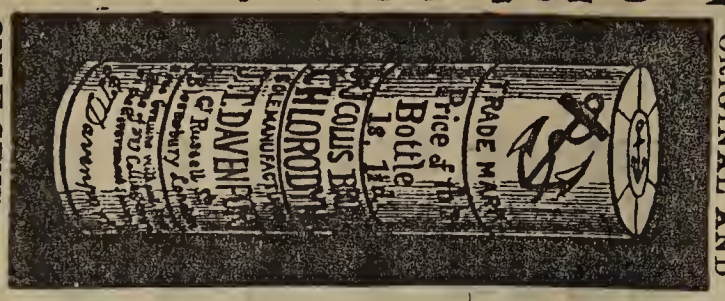
ONLY GENUINE.  ORIGINAL AND

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Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

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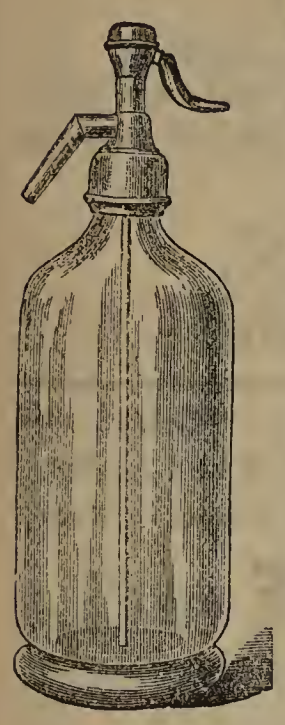

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NOTES ON JALAP TUBERS GROWN AT MUSSOORIE, N.W.P., INDIA.

BY C. J. H. WARDEN,

Chemical Examiner to Government.

The jalap tubers referred to in this note were received from Mr. Duther, Superintendent of the Government Botanical Gardens, Sahâranpur, N.W.P., and were grown at the Mussoorie branch garden at an elevation of 5000 feet. Mr. Gillan, the head gardener, kindly furnished the following particulars regarding the cultivation of the *Ipomœa purga*. He states:—

"We began in 1884 with 300 small tubers weighing 16 pounds, obtained from the Ootacamund gardens. In 1885, when the crop was lifted, the tubers numbered 2150 and weighed 100 pounds. I am somewhat doubtful, though, if the weight given was correct. They were weighed by the native overseer, who was there in charge of the gardens, and I think he purposely exaggerated the weight of produce. In 1886 the tubers were again lifted and weighed in my presence. The crop was a much larger one and equally as healthy as in the previous year, but I only found an increase of 74 pounds in weight on the crop of 1885. I did not count the tubers last year, so cannot compare numbers produced in 1886 with those of 1885. This year the plot has not been disturbed. I noticed when digging up the tubers last year that the roots were in active growth and many small tubers were destroyed. The vines had died down some time previously, and naturally one would not have expected active growth in the roots. As jalap will always have to be dug up at the same season, viz., during the month of February, a certain proportion of young tubers will always be destroyed during the process of lifting; but this will not matter so much after our stock is increased, for one or two plots can be lifted one year, whilst others would be left undisturbed until the following year, and so on. The method of cultivation is as follows:—The ground is prepared by digging trenches two feet wide, and of the same depth, at intervals of six feet. The trenches are refilled with open surface soil finely intermixed with decayed cow dung. After all the required trenches have been prepared in this way a single row of tubers is planted in each trench at one foot apart, and the tubers inserted about six inches deep in the ground. When the vines begin to shoot the rows are staked out with branches in the same manner as for garden peas. The vines climb on these, and no further care is necessary beyond watering during dry weather, and frequent weeding during the rains. The season for lifting or transplanting the tubers is in the month of February. Porcupines are fond of the fresh tubers, and where these animals exist the fields must be protected by efficient fencing."

Six tubers were sent me in March, and as they varied much in size, I thought it might be of interest to examine them separately, in order to ascertain whether or not there was any definite ratio between size and amount of active principle.

After having been carefully cleaned to remove adherent matter, the tubers were weighed, with the following results:—

a	1035 grams.
b	210 „
c	163 „
d	121 „
e	82 „
f	47 „

The tubers were then sliced, and dried by exposure to a gentle heat with free exposure to air, and reduced to a fine powder. For analysis a portion of air-dried powder was heated for several hours in a water-bath to 100° C. All the results have been calculated on tubers dried at that temperature.

The tubers in their original condition contained on an average 61·77 per cent. of moisture.

For the determination of ash the jalap powder was carbonized at a low temperature in a shallow platinum dish, and the incineration completed in a muffle at a dull red-heat.

a	ash per cent. 4·594
b	„ „ 4·589
c	„ „ 5·028
d	„ „ 4·861
e	„ „ 5·482
f	„ „ 4·870

In every instance the ash was beautifully white. On an average 67·35 per cent. of the ash was soluble in water.

The extract was obtained by hot continuous percolation with 88 per cent. alcohol. The resulting tincture was heated on the water-bath in a weighed beaker till the extract was free from the odour of alcohol, then transferred to the hot-water oven, and the desiccation completed over sulphuric acid in a vacuum.

a	extract per cent. 10·756
b	„ „ 14·326
c	„ „ 13·856
d	„ „ 11·316
e	„ „ 15·367
f	„ „ 12·893

The extracts varied in colour, the extract from sample *e* being very dark, while that from *f* was almost colourless. The remaining extracts were amber coloured. All the extracts had a fruity odour, but that obtained from *f* had the smell most marked.

The jalap resin was obtained by treating the extract repeatedly with boiling distilled water with constant agitation, filtering, drying the filter paper and dissolving out any adherent particles of resin with boiling spirit. I found this method afford better results than the usual plan of converting the extract into a concentrated tincture, and pouring it into water, etc.

a.—resin per cent. calculated on extract	74·378
b „ „ „ „	66·954
c „ „ „ „	77·845
d „ „ „ „	56·767
e „ „ „ „	68·881
f „ „ „ „	70·964
a—resin per cent. calculated on tubers	8·013
b „ „ „ „	9·592
c „ „ „ „	10·786
d „ „ „ „	6·424
e „ „ „ „	10·586
f „ „ „ „	9·150

The separation of the jalapin from the convolvulin was performed by repeatedly agitating a weighed portion of the crude resin with anhydrous ether, collecting the ether solution in a tared beaker, evaporating, drying at 100° C. in the water-bath, and then keeping the beaker in a vacuum over sulphuric acid for some hours before weighing.

a—jalapin per cent. calculated on resin	15·183
b „ „ „ „	13·292
c „ „ „ „	10·219
d „ „ „ „	13·671
e „ „ „ „	11·891
f „ „ „ „	12·046
a—jalapin per cent. calculated on tubers	1·216
b „ „ „ „	1·275
c „ „ „ „	1·329
d „ „ „ „	·878
e „ „ „ „	1·258
f „ „ „ „	1·227

I have only been able to find one reference to the ash content of jalap tubers. W. Coblentz* states that he obtained 11·016 per cent. from commercial air-dry jalap of fair quality.

A large number of resin determinations in *Ipomœa purga* grown in different localities are given in the 'Pharmacographia,' which may be tabulated as follows, and to facilitate comparison I have also included the highest and lowest results obtained by me from the examination of the samples which are the subject of this note :—

Guibourt	17·	per cent.
Umney	21·5	,,
Squibb	11 to 16·	,,
T. and H. Smith	Not more than 15·	,,
D. Hanbury	11 to 15·8	,,
Marquart, from jalap grown at Bonn	12·	,,
Widnmann, from jalap grown at Münich	22·	,,
W. G. Smith, from jalap grown at Dublin	9 to 12·	,,
Flückiger and Hanbury, from jalap grown at Ootacamund	18·	,,
Warden, from jalap grown at Mussoorie	6·4 to 10·7	,,

From another specimen of tubers examined by me, also grown at Mussoorie, of which the largest weighed 47, and the smallest 4 grams, I obtained 12·372 per cent. of resin calculated on the dried tubers.

According to the authors of the 'Pharmacographia,' the crude resin contains from 5 to 7 per cent. of jalapin. Umney gives 12 per cent ; the mean of my six determinations gives 12·6 per cent. While from the mixed specimen to which reference has been made I obtained 12·037 per cent.

As far as my results go there does not appear to be any definite ratio between size of the tubers and amount of extract and resin present.

Medical College, Calcutta.

THE EXHIBITION AT MANCHESTER.

(*Concluded from page* 110.)

Group VI., "Fine Chemicals, Alkaloids, Essences and Extracts," although numbering only eight exhibits, includes many articles of very great interest, since here are to be found samples of most of the recent contributions from the chemical laboratory to the materia medica, as well as other compounds of wider chemical interest. Taking the English exhibitors first, Howards and Sons of Stratford have a case, the principal feature of which is a very complete series of the cinchona alkaloids and their salts, including the new base cupreine. One sample of sulphate of quinine has a very unusual appearance for that salt. There are also samples of cocaine, urethan and other chemicals manufactured by this house. Woolley, Sons, and Co., of Manchester, display several of the new remedies, such as urethan, salol, antifebrin, antipyrin, cocaine. Pharmacy is also represented in this case by coated pills, ointments, etc., and there are also some flavouring essences and other articles used in the manufacture of aerated waters. Another good show of "pure chemicals" for use in laboratories and science classes and for various technical purposes, arranged in stoppered bottles, with some standard solutions in tall cylinders, is to be seen in the case of Mottershead and Co., of Manchester.

* *Amer. Journ. Pharm.*, 1882, 385.

But it must be confessed that the finest displays of rare chemicals in the exhibition are to be found in the cases of two German manufacturers, Merck of Darmstadt, and Schuckardt of Goerlitz. The case of Merck may be fairly said to contain a sample of nearly every chemical compound that has been placed at the disposal of the therapeutist for several years past, as well as many others that are at present only chemical curiosities. Taking the now indispensable alkaloid from coca leaves for an example, a magnificent sample of cocaine hydrochlorate and one of the salicylate are accompanied by specimens of benzoyl-ecgonine, in prisms, and of ecgonine, the successive decomposition products of cocaine, as well as of cocaethyline, the base built up synthetically from ecgonine by Dr. Merck, in which a methyl group in cocaine is substituted by an ethyl group. Then caffeine is represented by a series of compounds which, notwithstanding existing scepticism as to its combination with acids, are asserted to be "true salts." There are also samples of the four soluble double salts of caffeine that were first made known by Tauret, and of ethoxy-caffeine, which has been recommended as a remedy for migraine. These two instances will serve to indicate the completeness with which each active principle is illustrated. Some that are shown, like hyoscine, are probably destined to assume greater prominence in the materia medica than they at present enjoy, whilst, on the other hand, the group of alkaloids isolated from quebracho bark—aspidospermine, aspidosamine, quebrachine and quebrachamine—will recall a remedy that is less heard of now than a few years ago. The recent synthetical feat of Hardy and Calmels will impart to pilocarpine and pilocarpidine at least a passing interest, and the statement made by the exhibitor that the two alkaloids produce the same physiological effect will be new to some. In the berberis and hydrastis alkaloids are seen compounds that appear to attract more attention in the United States than in this country ; the former being credited as useful in indigestion, diarrhœa and the sickness of pregnancy, and the latter as an antiperiodic in fever with inclination to diarrhœa, in certain diseases of the skin and for hæmorrhoids. Both alkaloids are rather insoluble, but the hydrochlorate and phosphate of berberine and the tartrate of hydrastine, which are shown, are said to be freely soluble salts. Many other articles shown in this case will be familiar to those who see the reports issued by this firm from time to time, though they can hardly be enumerated here ; but any pharmaceutical visitor to this exhibition with time at his disposal may profitably spend a little of it in associating the exhibits in this case with the information contained in the numbered catalogue issued by the firm.

The case of Dr. Schuckardt, of Goerlitz, although containing almost necessarily substances illustrated in those previously referred to, differs considerably in the richness of its display of rare metals and inorganic compounds as well as of organic compounds of great technical interest. Of the metals exhibited mention may first be made of selenium and tellurium, both nearly related in their chemical properties to sulphur, but both, in the form of pure metals, still very incomplete in their history. Besides these there are silicium, and zirconium with its oxide, now interesting and important for the preparation of the zirconium-light ; an extensive

series of sublimated chlorides and iodides of the rare metals niobium, tantalum, thorium, titanium and tungsten; likewise some prisms of chlorinated lime, employed by Professor Winkler for easily generating chlorine, acetate of chromium, a body especially adapted for quickly absorbing oxygen, and osmic acid. The exhibition in Manchester is, also, probably the only one in which there has been an opportunity of seeing such large quantities of very rare metals, or what purport to be such, as indium (100 grams), gallium, and the newest of all metals, germanium, which was discovered last year, the three elements being displayed in almost all their compounds. Among organic compounds of high scientific interest, may be mentioned the large groups of preparations of thiophene (C_4H_4S), which will certainly form for some space of time the basis for the study of the compounds of sulphur which contain carbon. Equally worthy of notice, are two methylparaphenyl-diamine bases, of which the dimethyl base supplies the means of determining the contents of lignose matter in paper, while the tetramethyl base allows of the detection of the smallest quantities of active oxygen from any source. Antipyretics are represented by hypnone, urethan and its methyl, propyl and chloral compounds; also by the antiseptic terebene and its concomitants in oil of turpentine, viz., silvestrene, pinene, dipentene, limonene, etc. Lastly, there are the two most recently discovered, and already much employed, preparations, antithermine or phenyl-hydrazine-lævulinic acid, $C_6H_6N_2C_5H_8O_2$, and acetphenetidin. Another group of compounds is represented by curarine, muscarine, choline, wrightine, harmaline and scopoline, to which may be added the sterilized culture media for bacteriological studies as agar-agar, peptone, gelatin of meat, blood serum, etc.

In the case of Kay Brothers, of Stockport, amongst a number of articles manufactured by this firm, may be seen a sample of "sea-water made potable." This, it may be assumed, has been prepared according to the method suggested by Mr. Kay for securing a sufficient supply of potable water to sustain life in emergencies at sea, which consists in treating sea water with an organic salt of silver. A more obvious attraction in this case, at least after dark, is the display of various coloured crystallizations on glass illuminated from within by glow lamps. These have been prepared by coating suitable thin glass shades on the outside with strands of cotton cord arranged symmetrically and placing them in concentrated saline solutions, the glasses being constantly rotated on their axes during the crystallization. In this group, too, will be found an exhibit by Thomas Christy and Co., of London, consisting principally of raw and manufactured drugs.

Group VII. contains "Dyes and Colouring Matters from other Sources than Coal Tar," but these are less various and numerous than their modern and successful rivals. Indigo is well represented in the case of Millward and Cryer, of Manchester, and several dye woods and extracts are show by Milnes and Brother, of Bury, among the former being a block of the red quebracho wood (*Loxopterygium Lorentzii*), which a few years ago was confounded for a time in the drug lists with the white quebracho bark (*Aspidosperma Quebracho*).

Group VIII. illustrates "Metallurgy." Perhaps the most economically important exhibit in this group is that of P. C. Gilchrist, consisting of steel and slag obtained from phosphoric pig-iron by the "basic" or Thomas-Gilchrist process, which has so vastly extended the application of the Bessemer converter. Specimens illustrating the use of the basic slag as a fertilizer and of phosphate and superphosphate of lime manufactured from it are to be seen in the case contributed by the Salisbury College of Agriculture. A very varied collection of antimony ore, metal and compounds, together with samples of magnesium, potassium, sodium, bismuth, gold, silver, etc., is shown by the Magnesium Metal Company, of Patricroft. Wiggin and Co., of Birmingham, show specimens of nickel and cobalt ore, and also illustrate the intermediate stages between the ores and the deposit of the metals as "electroplating." There are also in this case some beautiful specimens of cobalt silicate in two shades of purple. Lastly, Johnson, Mathey and Co., exhibit a magnificent apparatus made entirely in platinum, consisting of two stills for concentrating sulphuric acid; it is said to be capable of working ten tons of acid daily, and is valued at £3000.

Group IX., "Alkalies, Acids and Salts," is, as might be expected, one of the chief features of the Chemical section, containing as it does exhibits from most of the principal chemical manufacturers of Lancashire and Cheshire. Carbonate and bicarbonate of soda, soda crystals, caustic soda, bleaching powder and allied products, are shown by such firms as Gaskell, Deacon and Co., of Widnes; Muspratt and Sons, of Liverpool; Brunner, Mond and Co., of Northwich; Gamble and Son, and Kurtz and Co., of St. Helens; the Widnes Alkali Company and the Greenbank Alkali Company; whilst Bell Brothers, Limited, illustrate the salt deposits at Middlesborough which have been opened up so opportunely for the English alkali trade. Tennants and Co., of Manchester, make a specialty of the mineral acids, the sulphates of magnesia, soda and copper, tin crystals and solutions. Sulphites and bisulphites are the principal feature in the case of Collett and Co., of Gloucester, and the connection of these compounds with the brewing industry explains the otherwise anomalous appearance by their side of a series of varieties of isinglass from Russia, Siberia, Hudson's Bay, Brazil, West Indies, Penang, Bombay, Kurrachee, China and Manila. One exhibit here that cannot be very well overlooked is the enormous crystallization of alum shown by Peter Spence and Sons, which is said to weigh upwards of ten tons and a quarter. This firm also shows other aluminous preparations used by paper makers, dyers and calico printers. An exhibit of an analogous character is that of Pochin and Co., Limited, consisting of the aluminous cake prepared from china clay, placed at the disposal of paper makers by Mr. Pochin, upwards of thirty years ago, and the more recently introduced "concentrated alum," or neutral sulphate of alumina. Other exhibits worth noticing in this group are a crystallization of green copperas, from the works of Buckley of Manchester; specimens of borax and various compounds of it, adapted for fish preservation and other domestic and technical purposes, shown by Pursell and Co., of Leith; and some models contrasting the old and new processes of acetification, shown by R. and N. Pott, of Southwark. In several of the cases in this group are shown some objects of great beauty, quite worthy of

the name "chemical gems" that has been appropriated to them. They appear to consist of thin crystalline plates of potassium chlorate, possibly ground in a special way so as to expose the planes of cleavage and produce the conditions favourable to the display of a brilliant iridescence. The great reflective power acquired by potassium chlorate that has been heated to nearly its point of fusion, and then allowed to cool, has been pointed out by Professor Madan (*Pharm. Journ.*, [3], xvi., 1008).

Group X., "Fats, Oils and Soaps." The last-named article is exhibited in variety adequate even to represent the enormously increased competition among soap makers in recent years. Perhaps the exhibit that will best repay inspection is that of Gossage and Sons, of Widnes, because besides an enormous trophy in mottled soap, it contains samples of coprah, palm nuts and other raw materials from which much of the oil used in soap making is now derived. Prominence is also given to silicate of soda as a soap-making material and for use in calico printing, and there are some good looking samples of glycerine. As might be expected in such a manufacturing centre there is a good display of lubricating oils.

Group XI., "Tanning," does not contain much of special interest to pharmacists. In one or two cases there are displays of myrobalans, divi-divi, valonia and similar raw materials and their extracts, and there is also a good show by Grindley and Co., of Bishopsgate Avenue, of isinglass, which seems to be almost as unfortunately placed here as the one before referred to is among the "acids, alkalies and salts."

Group XII., "India-rubber, Gutta Percha, etc.," which is placed in the western half of Section III., is a very fine collection illustrative of the application of these valuable plant juices to economic purposes, especially to waterproofing, but cannot be enlarged upon here. The "Willesden" waterproof fabrics, made by treating paper and canvas with cupro-ammonium solutions, will be found among the next group.

Group XIII., "Building Materials."—Some of the stoneware pottery for chemical operations shown in this group will no doubt attract attention.

Group XIV., "Sugar, Gums and Starches." In this group there is an interesting exhibit by Tootell and Co., of Liverpool, showing various products of the potato when devoted to manufacturing purposes, such as the farina, dextrin, glucose, potato spirit, etc.; besides which, there are sago, in various stages of manufacture, tapioca bulbs and starch, maize starch and rice starch. Starches are also shown by Lilley and Co., of Manchester, and Stiff and Co., of Bristol. Shellac and gums are shown by Thew and Stiebel, of Manchester, and there are two or three good exhibits of sugar.

Group XV., "Miscellaneous." This group answers well to its description, for it contains a little of many things. Lager beer and whisky are compensated for by aerated waters, of which there is an exhibit by Jewsbury and Brown, and filters in great variety. Kepler's extract, hazeline, Nestlé's food, Montserrat lime juice, Towle's chlorodyne, "Liebig's" beef wine, fluid beef, and many other equally well-known articles come under this inclusive designation. Even conscientious prejudices appear to be catered for, the list winding up with "pure wines for ecclesiastical purposes and invalid brandies.

MEXICAN LIGN ALOES.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

Although the essential oil bearing the above name has been a commercial article for many years, and was noticed in the columns of this Journal by Mr. J. Collins as long ago as 1869, yet nothing definite has been ascertained concerning its botanical source until quite lately. Three years ago a description of the tree yielding the oil was published by M. Poisson in the *Bull. de l'Assoc. Franç. pour l'Avancement des Sciences*, xiii., p. 305, pl. x. (Blois, 1884), but in consequence of the difficulty of access to this publication, it has been overlooked even by the authors of the 'Biologia Centrali-Americana,' and it was only during a recent visit of Professor Baillon to the Museum of the Pharmaceutical Society that my attention was called by him to the article in question. It seems desirable, therefore, to place on record in this Journal an abstract of that paper.

M. Poisson was led to inquire into the botanical source of the product through seeing specimens of the wood and oil at the Paris Exhibition of 1878, where these products were exhibited by Messrs. Ollivier and Rousseau, of Paris. These gentlemen obtained specimens of the leaves, flowers and fruit from their correspondent in Mexico, M. Delpech, in whose honour the tree has been named by M. Poisson. The description he gives of the tree is as follows:—

"*Bursera Delpechiana.*—Foliis apice ramulorum congestis, tenuibus novellis utrinque, imprimis subtus, costis et nervis tenuiter pilosis, 3-jugis; foliolis ellipticis, utrinque acutis, crenato-serratis; interstitiis inter juga anguste alatis; paniculis folia æquantibus breviter pilosis, compositis, laxifloris, bracteolis angustissime linearibus, pedicellis tenuissimis, calycis lobis brevibus deltoideis atque petalis oblongis 5 poll. longioribus, sparse et longe pilosis, staminibus quam petala paullo brevioribus, filamentis quam antheræ oblongo-ovatæ 4 poll. longioribus; drupis ovoideis glabris."

"Folia 5–6 cent. longa, interstitiis interjugalibus 7–8 mill. longis, 1–1½ mill. latis; foliola 1½–2 cent. longa, 8–10 mill. lata, nervis lateralibus 1½–2 mill. distantibus. Paniculæ (e cymis compositæ) axillares numerosæ 5–7 cent. longæ, ramulis secundariis 1½–2 cent. longis, pedicellis 3–4 mill. æquantibus, bracteolis tenuissimis 2–4 mill longis. Calycis lobi vix 1 mill. longi. Petala (æstivatione valvata) 4 mill. longa, 1 mill. lata. Staminum filamenta 3 m. longa, antheræ vix 1 mill. æquantes. Drupæ fere 1 cent. longæ. Mexico circa urb. dict. Cuantla Morelos."

The species is characterized by the excessive brevity of the calyx, of which the lobes are not well marked. It belongs to the set of species peculiar to Mexico, including *B. Aloexylon*, Engl., and *B. penicillata*, Engl. The tree is of medium height. According to M. Delpech, the wood in a fresh and healthy state is almost devoid of odour, and it is only where a branch has been broken off or insects have pierced the wood that the oil becomes developed.* He states that old trunks may afford as much as 10 to 12 per cent. of oil. This difference in the wood is not recognized by the native Indians who collect it, and consequently the tree is felled in a reckless manner, so that it has almost disappeared from Cuantla Morelos, where it formerly abounded. The pure oil is obtained by M. Delpech by distillation by steam heat, and costs 20 to 25 francs per

* The section of wood in the Museum of the Society is about 6 inches in diameter, but shows no sign of insect-boring.

kilogram; an inferior oil prepared by the natives is sold for a lower price.

The structure of the wood presents the following characters. The fibres are of medium length with the walls only slightly thickened; each is divided transversely by numerous thin walls constituting a kind of ligneous parenchyma, of which the whole wood is formed. On transverse section the fibres are seen to be all of equal thickness, so that it is not easy to distinguish the zones of growth of the wood.

The vessels are of large size, with numerous transverse trabeculæ, which on longitudinal section are seen to give a moniliform appearance to the vessels; they are dotted all over, the dots being surrounded with areolæ.

The medullary rays are thin, and have two to four courses of cells in thickness. It is chiefly in the fibres and medullary rays that the nearly solid odorous substance occurs. It is of a yellowish resinoid aspect under the microscope, and fills them either wholly or partially. All the fibres, however, do not contain it, and it is most abundant where the wood is streaked with dark veins. This matter is soluble in alcohol, so that the wood treated with spirit becomes transparent under the microscope. In the green and healthy state the wood presents the same appearance, without any trace of oil, although at the same time the oil may be perceived in the fruits and bark by rubbing them. In M. Léon Marchaud's memoir on the "*Organization of the Burseraceæ*," a somewhat similar occurrence is mentioned. The resinous and perfumed matter of *Balsamodendron Myrrha*, *B. africanum* and *Protium obtusifolium* is localized in the pith of the young branches to some degree, but is abundant in the bark and pericarp of the fruits of these plants.

The oil of lign aloes has been examined by Messrs. Verneuil and Poisson. Their experiments show that the wood cut into shavings readily yields the oil by distillation with steam, 7 to 9 per cent. being thus obtained, and the wood when dry is then found to be free from odour.

When the oil is dried over chloride of calcium, it distils over almost entirely between 189° and 192°, a small quantity of a resinous body of a much less volatile character remaining in the still. It is an oxygenated body having the formula $2(C_{10}H_8)5H_2O$, this formula answering to that of a hydrate of terebenthene or of an insomer. The oil slowly absorbs oxygen and becomes resinified. It does not combine with bisulphite of sodium. The red-brown coloration which it takes under concentrated sulphuric acid is analogous to that which turpentine produces with the same acid. The odour of the oil is likened by M. Poisson to a mixture of lemon and jasmin. The specimens that I have seen have more resemblance to bergamot in odour.

It is difficult to say whether other species of Bursera yield this oil or no. M. Poisson suggests that it is probably obtained also from *Bursera Aloexylon*, Engl. (*Elaphrium Aloexylon*, Schiede).

The new Mexican Pharmacopœia (1884), p. 75, also gives *Amyris linaloe*, La Llave, which is a synonym of *Bursera Aloexylon*, Engl., as the source of the oil.

Schlectendal, however, in 'Linnæa' (1843), xviii., p. 303, remarks that this species has a fennel-like odour. A specimen in the Kew Herbarium, presented by Mr. Piesse as the Lignaloe plant, is labelled "*Elaphrium graveolens*, K.," from the West coast of N. Mexico. This identification is, however, according to Professor Oliver, somewhat uncertain. Several other species of Bursera grow in the same district as *B. Delpechiana*, including *B. bicolor*, Engl., *B. Schiedeana*, Engl., and *B. jorullensis*, Engl., but nothing appears to be known about the oil of these trees. Schlectendal mentions, *l.c.*, that *Elaphrium glabrifolium* (=*Bursera penicillata*, Engl.) has a strong aromatic odour, and that *Amyris ventricosa* (=*Bursera fagaroides*, Engl. var.) has an odour of caraways. The Mexican species of the genus appear to be very numerous, and require further examination as to their economic products. It is, however, satisfactory to be able to refer Mexican oil of lign aloes with certainty to one species, for there can be no doubt that *B. Delpechiana* is one of the principal sources of it.

NOTE ON THE EXAMINATION OF A SAMPLE OF COMMERCIAL QUININE SULPHATE.*

BY DR. DE VRIJ.

For the purpose of ascertaining whether the quinine sulphate manufactured under the direction of Dr. Hesse for the house of Jobst, in Stuttgart, has that constancy of composition which is requisite for a medicinal agent of such importance, I requested a friend in the drug trade to procure for me direct from that firm a kilogram of the article for examination.

Optical examination.—Five grams of the salt was dissolved in 200 grams of water with the aid of heat, and mixed with 5 grams of sodium tartrate dissolved in a small quantity of hot water. After a few seconds quinine tartrate separated in regular crystals which were collected the day after on a filter, washed, and dried by exposure to the air.† The mother-liquor showed no change on the addition of a concentrated solution of sodium tartrate in large excess. The tartrate obtained was examined by M. Koppeschaar with one of Laurent's polariscopes according to the method of Oudemans, and it was found to give for the concentration A in a tube of 500 millimetres $[\alpha]_D = -209°$. Applying Oudemans' formula to this result the tartrate was shown to contain 91·95 per cent. quinine tartrate, and 8·05 cinchonidine tartrate.

Being surprised at this apparently large quantity of cinchonidine salt, I supposed it possible that the sulphate might contain hydroquinine, and I determined to examine this point further. But since Dr. Hesse bases his criticisms not only upon the presence of hydroquinine,‡ but also upon the presence of quinine in the cinchonidine separated from quinine sulphate, either by the method of Schäfer or by my own method, it was necessary for me to separate the cinchonidine in a form that would not allow of the least doubt as to its purity.

One hundred grams of the sulphate under examination was converted into acid sulphate, and after having separated the quinine as far as possible in that form the

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* From the *Moniteur Scientifique*, July, 1887.

† Koppeschaar's experiments show that these crystals do not lose their water of crystallization at 30° C.

‡ Hesse admits that quinine sulphate may sometimes contain as much as 8 per cent. of hydroquinine sulphate, and on that ground he bases his criticism of the optical method. I suppose that in his interested laudation he does not find it inconvenient in his capacity of manufacturer, to pass off as quinine an alkaloid containing an extra molecule (*sic*) of hydrogen, and consequently having a composition different from that of true quinine. However, I doubt whether therapeutists will adopt that view of the matter, for if it be admissible to tolerate in quinine sulphate the presence of variable quantities of an alkaloid having a composition different from that of true quinine, it should still less be inconvenient to tolerate the presence of quinidine, the composition of which is identical with that of quinine, and if that be the case, a medicinal agent so important as quinine sulphate may become in future an article of variable composition that will on that account be less deserving of confidence.

remaining mother-liquor would contain the cinchonidine and the hydroquinine, if that alkaloid were present, together with some quinine. In order to separate these bases the bisulphates were evaporated to dryness on the water-bath, and the residue treated with alcohol of 97°.* By this treatment the bisulphates of quinine and of hydroquinine would be dissolved, while the bisulphate of cinchonidine would partly remain undissolved. After standing for a day at a temperature of 2° C. a further notable quantity of the cinchonidine salt would be deposited. In this way the greater part† of the cinchonidine can be separated in the form of bisulphate, having, according to Schäfer, the composition represented by the formula $C_{19}H_{22}N_2O$, $2H_2SO_4 + 2H_2O$, and in the case of the salt now referred to the quantity amounted to 7·8 grams, containing 4·36 of cinchonidine, equivalent to 5·87 of crystallized cinchonidine sulphate. The mother-liquor from which this was separated still containing cinchonidine, and quinine had to be examined for hydroquinine.

Separation of hydroquinine.—This operation, which is very delicate and tedious to carry out,‡ is based upon the following principles :—

1. The slight solubility of cinchonidine in ether.
2. The copious solubility of quinine and of hydroquinine in ether.
3. The slight solubility of quinine chromate in water, 1 part in 2645 parts at 15° C.
4. The greater solubility of hydroquinine chromate in water, 1 part in 663 parts at 15° C.
5. The capability of water solutions of quinine and hydroquinine chromates to bear a temperature of ebullition without decomposition of these salts.
6. The liability of cinchonidine chromate to decomposition when its water solution is heated above 40° C., together with the greater solubility of this salt, 1 part in 250 parts at 15° C.

In the treatment of the mother-liquor above mentioned, these principles were applied as follows :—

After evaporating off the alcohol on a water-bath, the residue was dissolved in water and neutralized with caustic soda, so as to obtain a solution having a slightly alkaline reaction. On adding to this solution sufficient neutral potassium chromate to convert the bases into chromates, a large portion of these salts separated. Then, on heating to the boiling point, the whole would be dissolved, if the quantity of water were sufficient, with the exception of a brown resinoid matter originating from the decomposition of cinchonidine.§ On cooling, the greater part of the quinine and hydroquinine chromates deposited in the form of crystals while the mother-liquor retained small portions together with greater part of the cinchonidine. This mother-liquor was set aside for the moment, and the crystals were redissolved in boiling water, this operation being repeated several times until the mother-liquor separated from the crystals of chromate was no longer made turbid by the addition of a few drops of caustic soda, even after being heated.* The mother-liquors from the successive treatments of the quinine chromate with boiling water were mixed and precipitated by caustic soda. After settling, the solution was decanted off as much as possible, and the residue shaken with ether. By this means the quinine and the hydroquinine were dissolved with a small part of the cinchonidine, while the greater part of the cinchonidine remained undissolved. This latter was collected upon a filter and dissolved in the least possible quantity of hot alcohol. Then the solution was mixed gradually with small quantities of hot water until the liquid commenced to become turbid, and then it was left to cool. By this operation the cinchonidine was separated in the form of small crystalline scales, which, after being washed and dried, weighed 0·861 gram.

The ether solution separated from the undissolved cinchonidine was distilled, and the residue dissolved with dilute nitric acid. After making this solution slightly alkaline by adding caustic soda, it was warmed and mixed with neutral potassium chromate. The crystals which separated on cooling consisted partly of quinine chromate. These crystals were treated with successive small quantities of boiling water until the washings after cooling gave no precipitate on adding caustic soda, even upon warming. If this operation be well carried out almost all the quinine is separated in the form of chromate while the hydroquinine chromate will be contained in the mother-liquor and the washings of the crystals. These liquors were mixed, precipitated with caustic soda, and the precipitate dissolved with ether. After evaporating off the ether the residue weighed 0·677 gram. It was converted into tartrate and found to give a rotation of $-160°{\cdot}83$. This rotation being inferior to that of hydroquinine tartrate (found by Koppeschaar for the concentration A to be $[\alpha]_D = -180°{\cdot}83$ and for the concentration B $[\alpha]_D = -176°{\cdot}66$) it showed that the 0·677 gram of alkaloid obtained from the ether solution was not pure hydroquinine, but still contained cinchonidine. For this reason the acid solution of tartrate was treated after the observation with caustic soda and ether. The alkaloid obtained after evaporating off the ether was dissolved with dilute nitric acid, and after making the solution slightly alkaline it was mixed with neutral potassium chromate. On boiling this solution it was found to contain appreciable traces of cinchonidine. By repeating the boiling and adding small quantities of caustic soda to neutralize the cinchonidine bichromate formed by the boiling I succeeded at last in obtaining a clear yellow solution, which gave after some hours fine crystals of pure hydroquinine chromate. This salt, together with 7·8 grams of cinchonidine bisulphate and 0·861 of cinchonidine in scales,†—all

* This method is taken from L. Schäfer, who published it in the *Pharmaceutische Zeitung* of February 16 last, p. 97. The method serves not only for the preparation of pure cinchonidine, but also to demonstrate that Skraup and Vortmann were right in entertaining a doubt as to the existence of the homocinchonidine of Dr. Hesse. On applying this method to 100 grams of the so-called homocinchonidine procured from Taillandier I obtained a bisulphate, from which I extracted an alkaloid perfectly identical with that obtained by the same process from the ordinary cinchonidine of commerce.

† Schäfer admits that in applying this method to 1 gram of a mixture of quinine and cinchonidine containing more than 50 per cent. of the latter alkaloid 5 per cent. of the cinchonidine remains in the mother-liquor.

‡ In order to avoid fruitless work, chemists accustomed to manipulate tartrates of quinine and cinchonidine for optical examination may satisfy themselves beforehand of the presence of hydroquinine. The tartrate of that alkaloid is a little more soluble in water than quinine tartrate, and much more so than cinchonidine tartrate. On this account the mother-liquor of hydroquinine tartrate is rendered more turbid than the mother-liquor of quinine tartrate by the addition of caustic soda.

§ The water solution of cinchonidine chromate begins to decompose at a temperature above 40° C., yielding bichromate, which remains in solution, and cinchonidine, which separates in a crystalline form. When the heating of the liquid is continued the bichromate is decomposed, with production of a brown resinoid substance.

* Quinine chromate treated in this manner cannot contain a trace of any foreign chromate. It may contain some cinchonidine in the free state originating from the decomposition of cinchonidine chromate, but that would be left on the filter if the solution of the chromate in boiling water were filtered while hot. Consequently there is no difficulty in obtaining perfectly pure quinine chromate. I have satisfied myself of this by converting purified quinine chromate into tartrate, and on submitting that to optical examination I have found it to possess the exact molecular rotation of chemically pure quinine tartrate.

† I admit that this cinchonidine still contains some quinine that would have to be deducted from the 0·861 gram, but that quantity is largely compensated for by the loss of cinchonidine due to the decomposition of the chromate during the boiling of the solution.

obtained from 100 grams of the quinine sulphate which was the subject of examination,—have been presented by me to the collection of the Polytechnic School, at Delft, in order to serve as evidence in support of my representations. If I have been minute in stating the details of the case it has been in order to put chemists in a position to make the acquaintance of hydroquinine, which is still an alkaloid but little known. For this reason I add that hydroquinine chromate differs from quinine chromate in being copiously soluble in chloroform, while quinine chromate is only dissolved with difficulty by that liquid. Unfortunately, these two chromates, which are so stable in water solutions, soon undergo decomposition when dissolved in chloroform, so that although chloroform may be used to distinguish them it will not serve for their separation.

LOBELIA INFLATA.*

BY J. U. AND C. G. LLOYD.

(*Concluded from Vol. XVII., page* 1038.)

Preparation of Lobeline.—Extract the oil from powdered lobelia seed, by means of benzine, and dry the residue. Then acidulate the dry powder with a mixture of acetic acid one part, alcohol nine parts, and pack firmly in a glass percolator. Exhaust with a menstruum made of acetic acid one part, alcohol twenty parts. Evaporate the liquid, and when cold, add water enough to make a thin syrup, and extract the alkaloid from it by means of ether, adding cautiously ammonia† to slight alkaline reaction. The ethereal liquid is then to be decanted, evaporated in presence of water that has been previously acidulated with acetic acid to excess. The watery layer is cooled, separated from overlying oil, filtered, and again extracted with ether to which ammonia is again cautiously added to slight excess. This ethereal liquid will be colourless (if not so repeat the operation) and it contains the alkaloid *lobeline*. It has been supposed to contain *only* the alkaloid, but, in addition there is a volatile oil and inflatin.

If this ethereal solution is evaporated, a colourless glassy layer remains, of a strong odour, and which turns yellow and even brown upon exposure. It is partly soluble in acidulated water,‡ yielding the alkaloid, mixed with various amounts of the associated impurities. It dissolves in alcohol, ether and chloroform, but only incompletely in benzol and carbon disulphide.

If the ethereal solution is evaporated in contact with acids (excepting acetic acid) an amorphous layer usually interspersed with crystalline formations remains. These crystals we formerly took to be *salts of lobeline* If this crystalline layer be extracted with carbon disulphide,§ the crystals disappear and the acrid material remains. If now, the residue (a salt of lobeline) be exposed to the dry atmosphere for a few days, it becomes odourless from escape of the volatile oil. Then it will dissolve in water, especially if slightly acid, and after filtration can be extracted colourless and as we now believe pure, by sulphuric ether in connection with a slight excess of ammonia.*

Properties of Lobeline.—Lobeline is alkaline in reaction, colourless, odourless, soluble in alcohol, chloroform, ether,† benzol, carbon disulphide, and somewhat soluble in water. We have not succeeded in crystallizing it. It is not hygroscopic (Wittstein *contra*). In pure condition lobeline can be exposed to the air for days, and is probably permanent. We evaporated, by exposure, a solution in water rendered strongly alkaline by ammonia,‡ which changed to yellow, showing some decomposition, but which retained all the sensible properties of the alkaloid, remaining very acrid and being a violent emetic.

Lobeline turns red with sulphuric acid, yellow with nitric acid, and dissolves colourless in hydrochloric acid. Heated with sulphuric acid it turns black; with nitric acid evolves the usual vapours of nitric oxide, with formation of a yellow liquid; and hydrochloric acid evaporates from it unchanged.

Salts of lobeline are very soluble in water, and those we have examined dissolve in alcohol and ether, but very slightly (excepting the acetate) in carbon disulphide.§

From moderately strong aqueous solutions of the salts of lobeline, alkali precipitates the alkaloid, white, flocculent, amorphous and odourless. This precipitate dries to a glassy layer that will powder white,‖ but this must be cautiously performed as minute amounts of the dust excite violent irritation of the nostrils, air passages and lungs, equal to, if not more intense than veratrine.

All the alkaloidal reagents precipitate lobeline from aqueous solution of its salts.

We have as yet failed to crystallize salts of pure lobeline, but we think that such a positive alkaloid will furnish crystals under proper conditions.¶

Lobeline and its salts are among the most powerful of emetics, and extremely small amounts of the solution of the colourless alkaloid (one drop being placed on the tongue) caused those to whom we administered it to vomit *immediately*. There was no unpleasant after effect. In the crude condition, as former investigators have obtained it from ethereal solution (even colourless as we made it), decomposition occurs and it rapidly darkens.

Résumé.—The alkaloid lobeline has evidently been impure as heretofore described, and may not be pure as we obtain it. Others state that it is yellow and has an odour; this certainly is erroneous, for we produced it colourless and odourless. Others have obtained what was considered crystalline salts; we also formerly thought this easy, but found the crystalline material to be an impurity, to which we can find no previous reference. It has never been analysed, but, if our present line of manipulation is successful, further remarks will follow, and a combustion made by recognized authority.

Having considered the most prominent constituent of lobelia, we shall now pass to the most characteristic

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* Extract from the article on *Lobelia inflata* in the 'Drugs and Medicines of North America.'

† Some use magnesia, thinking that ammonia decomposes the alkaloid. Any alkali and heat will do so, but dilute ammonia in presence of ether does not alter it in appreciable amounts. Magnesia does not entirely decompose the salt (acetate) and a free alkali is necessary.

‡ It does not necessarily follow that because this body was once entirely dissolved in acidulated water, it will completely redissolve after being dried.

§ We think that former investigators failed to break up this mixture by using ether and alcohol only as solvents. These liquids dissolve the entire associated products, and acid water will also do so to an extent, although pure inflatin is insoluble in water.

* We make no claim to originality in the method of making lobeline. Our process differs somewhat from others, it is true, but, perhaps not materially. The aim is to divest the seeds of their oil, extract the alkaloid in stable condition and eliminate impurities without the application of more chemistry than is necessary.

† Wittstein in his 'Organic Constituents of Plants,' states that lobeline is insoluble in ether. This is a mistake.

‡ It is stated that alkalies destroy lobeline at once. This is incorrect.

§ This solvent, which seems to have been overlooked by others, enabled us to purify the crude lobeline as already stated, and as further explained under inflatin.

‖ This differs from statements of others, who describe it as an oily liquid.

¶ Sulphate of lobeline is quoted in commerce. We see no reason for presuming that if demanded in quantities it should not be crystallized. We also think that manufacturers who have a demand for the alkaloid should have been able to exclude the crystalline substance that we have found to accompany it.

principle which as before stated we have for descriptive purposes designated as inflatin.

Inflatin.—This substance exists ready formed in lobelia herb and seed, and may be extracted together with the fixed oil and chlorophyll by means of carbon disulphide. Since the oil passes with the inflatin through most solvents, and holds it in solution when the other solvents are evaporated, it is not feasible to separate inflatin from the extracted oil, although, we have obtained it by saponifying the oil and separating the soap.

Inflatin has certainly been obtained by the investigators who produced crude lobeline, beginning with Professor Procter, but owing to its intimate association with that alkaloid, and with the volatile oil of the plant, and to its refusal to crystallize while associated in this manner it has been overlooked.*

The glassy layer first obtained in the evaporation of lobeline from the ethereal liquid, if moistened with acid solutions will upon drying assume a partly crystalline condition. This led us to conclude that the salt of lobeline had crystallized. These crystals with varying conditions assume different forms, and hence, we were more easily misled when we used the several acids.

Preparation of Inflatin.—Evaporate in thin layers the ethereal solution of crude lobeline adding hydrochloric acid to slight excess. To the sticky product before completely dry, add a few drops of carbon disulphide,† and after flowing it about decant the solution into a shallow vessel. Repeat the operation with successive portions of carbon disulphide, and mix the liquids. It is best, if working small amounts, to allow the preceding portion to evaporate each time before adding the other.

The final product will resolve itself in a few hours into small white warty aggregations, perhaps (if very impure) imbedded in a viscid, tenacious, more or less yellow semi-liquid. These globules are *inflatin*, destitute often of crystalline form because of the pressure of the surrounding medium. Occasionally an isolated globule will resolve itself into a fragment and we have seen these globules under the microscope become crystalline strata without change of shape.

Carefully drop carbon disulphide on this layer and decant it at once into a clean glass as soon as it has taken up the globules, which will be before the yellow substance dissolves. As the carbon disulphide evaporates crystalline nodules will form. The crystals do not form as distinct, however, as if the product is redissolved in pure benzol and evaporated.

Since we have discovered the characteristics of this material, we have obtained it easily as follows:—Abstract the greenish oil from powdered lobelia seed by benzine, stopping the percolation when the percolate ceases to pass of a green colour (this abstracts much inflatin also). Dry the magma and extract it by means of carbon disulphide. Evaporate the carbon disulphide and cool the residue. It will crystallize to a magma of inflatin and a fixed oil. Place on bibulous paper and warm it, the oil is absorbed and the inflatin can be purified by crystallization.

Properties of Inflatin.—Inflatin is pure white and from carbon disulphide tends to form nodules of a crystalline structure or in great crystalline plates. The typical crystal is diamond shaped and perfectly transparent.

Inflatin is odourless, tasteless and refuses to unite with acids or alkalies. It is insoluble in water or glycerin, but soluble in carbon disulphide, benzol, chloroform, ether and alcohol in the order we have given. Sulphuric acid does not affect it, even the smallest crystals remaining sharp and distinct. Hot sulphuric acid decomposes it with formation of a black liquid.

Cold nitric acid has no action upon it, but develops the forms and angles of a crystalline layer under the microscope in magnificent distinctness, the centres of each crystal being pure white, and the ends jet black. Upon heating with nitric acid inflatin melts without change of colour, and upon evaporation of the acid, and resolution in benzol, crystallizes as before.

Upon boiling inflatin with Fehling's solution it turns brown, then black, but does not reduce the copper and does not dissolve.

Inflatin melts at 225° F., and at a lower temperature cools to a mass of crystalline structure.

Résumé.—From the preliminary examination that we have given this substance, we conclude that it is either a stearoptene or a vegetable wax, probably the former. Perhaps in mechanical suspension it produces the milky juice of the plant, but we did not discover it in time to examine the juice of the herb during its season. It is evidently of no medicinal importance, and is of interest we think simply because of its association with the other constituents of lobelia.

Volatile Oil of Lobelia.—Lobelianin.—All parts of the herb of fresh lobelia are pervaded by a volatile oil of a strong pungent odour, but with little taste and no acridity. It was described by Procter, 1838, who found that the tincture of lobelia, or the herb, distilled with water gave a distillate of a peculiar odour. Pereira, 1840, gave it the name *Lobelianin*, and stated that it had an *acrid* taste, but, Procter, 1842, decided that he was mistaken on this point, and, our investigations support Professor Procter.*

If a small amount of water be distilled from a large quantity of the dried herb (Pereira and Procter used the dry), and the distillate be reduced to about the freezing-point of water, it deposits groups of transparent crystals, which do not redissolve when the water is warmed. Upon dissolving them in appropriate solvents (any of the usual solvents for volatile oils) and evaporating the menstruum, this oil crystallizes in large groups of flat, transparent plates that do not often radiate from a common centre. They cover the slide and are nearly parallel connected by oblique plates, but not often in stellar groups.

Upon heating crystals of lobelianin† suspended in water it melts at a temperature of 160° F., and if melted on a glass surface it quickly evaporates without residue, evolving the pungency familiar to those who know the recent distillate.

It slowly evaporates upon exposure to the air and disappears.

Sulphuric and nitric acids dissolve it, and upon heating a slide of crystals to which a drop of nitric or sulphuric acids had been respectively added, the nitric acid evaporated without apparent change, while the sulphuric acid blackened and evolved empyreumatic vapours. It retains its crystalline form in ammonia water and liquor potassæ.

We could not determine if more than one oil is obtained by the act of distillation, but, it is probable that such is the case.

We endeavoured to obtain the substance we have called *inflatin*, by oxidation of this oil, but failed, although it is apparent that some constitutional difference exists in the volatile oil of fresh lobelia and that of dry. The oil of fresh lobelia did not crystallize in our hands.

Has Lobelia a Volatile Alkaloid?—Professor Procter, 1838,‡ found that both tincture of lobelia and the herb,

* Even if it has crystallized, the solvents formerly employed redissolve both it and the associated principles.

† This leaves the hydrochlorate of lobeline.

* We made a careful examination, distilling water from quantities of the herb, both fresh and dry, and we used the utmost care to avoid the passing over of spray with the vapour. The product gave simply (from the green herb) a volatile oil that could be separated by sulphuric ether, but it does not accumulate in amount sufficient to separate from the distillate unless the temperature be very low.

† Perhaps this name is inappropriate and should not be applied to a concrete volatile oil. However, it was first given by an authority we all respect and it has precedence.

‡ *American Journal of Pharmacy*, 1838, p. 104, experiments 4, 5, and 6.

with water, upon distillation gave a distillate of a peculiar odour, but destitute of acrimony. Pereira, 1840,* stated that it had in addition an *acrid* taste, which Procter, 1842,† decided was a mistake. Bastick, 1851,‡ states that "lobeline is volatile."

We made a careful examination, distilling water from quantities of the fresh herb. We used the utmost care to avoid the passing of undistilled liquid with the vapour, and failed to obtain either an alkaloid or an acrid distillate.§ The product was of strong odour, from it sulphuric ether dissolved the oil, but there was no trace of acridity or of an alkaloid. Then we used dry fresh lobelia in 10 pound lots, with water, and with water that was made alkaline with caustic potash. In both cases the distillate was free from acridity, and refused to affect any alkaloidal reagent.

We made a solution of pure sulphate of lobeline, rendered it alkaline with caustic potash, and distilled it to one-third. The distillate gave evidence of decomposition products, but no lobeline came over.‖

We therefore conclude that lobelia does not contain a volatile alkaloid, and that lobeline is not volatile. There is no reason that we can see to suppose that the alkaloid lobeline is chemically related to the alkaloid nicotine. That they have been associated is probably from the unfortunate name for lobelia, Indian tobacco, and the fact that the plants and alkaloids resemble in taste, and that both are emetic.

Lobelacrin. (So Called.)—Enders, 1871,¶ obtained a substance that he named *lobelacrin.* It was produced by exhausting lobelia with alcohol, adding charcoal and distilling. The charcoal was washed with water, treated with boiling alcohol, the alcohol evaporated and the residue extracted with chloroform. Upon evaporation of the chloroform "warty tufts" of a brown colour were obtained. This, Enders named *lobelacrin.* Lewis considered it perhaps a *lobeliate of lobeline.* We consider it a mixture of the oil (fixed) of lobelia, the substance that we have called inflatin, a brown resin, some lobeline and colouring matter. According to our examination, it is really a mixture of such substances as are extracted from lobelia by alcohol, and having refused to dissolve in water are soluble in chloroform. It will be evident to the reader that this process certainly cannot separate the oils, wax and like bodies. That an organic acid is present is also probable.

Fixed Oil of Lobelia.—Lobelia seed contains 30 per cent. of non-volatile oily matters. The true fixed oil of lobelia is bland and non-acrid. As usually obtained, even by expression, it is acrid from contaminations. Menstruums that dissolve the oil also dissolve the chlorophyll, hence it has a green colour as extracted from powdered seed. Pure fixed oil of lobelia has never been used in medicine, and would be of little value.

An impure oil is a favourite with Eclectic physicians, who use it alone and associated with other substances. It is a constituent of compound stillingia liniment, an excellent remedy, which, in our opinion, depends mainly upon this impure oil, which is simply a syrupy extract of lobelia seed, made with stronger alcohol acidulated with acetic acid.

Other Constituents of Lobelia.—There is a characteristic brown resin, colouring matters, and the usual constituents of plants. If the resin in alcoholic solution be precipitated by water even in presence of acid water, it carries with it a large amount of lobeline. This we thought to be a distinct alkaloid, but became assured, after purification, that it was simply lobeline.*

* 'Elements of Materia Medica,' vol. ii., 1846, p. 385 (and preceding edition).

† *American Journal of Pharmacy*, 1842, p. 4.

‡ *Pharm. Journ.*, 1851, p. 270.

§ The herb for these experiments was gathered to order and selected plant by plant. There was no foreign substance present, and the lobelia was prime.

‖ The neck of the retort was plugged near the retort with a strainer of linen to retain the spray. The neck was inclined to throw the condensed liquid back into the retort. Thus, only the vapour passed to the condenser. In the large still with the herb, the exit for vapour extended upward 25 feet to the condenser, and a spray could not pass over.

¶ 'Pharmacographia,' p. 400.

GELATIN BOUGIES, SUPPOSITORIES, ETC.†

BY GEORGE H. OCHSE, PH.G.

The proportions of gelatin, glycerin and water cannot be the same for all preparations, because the action of the medicament on the mass, diliquescence or coagulation, must be taken into consideration.

Where gelatin preparations are frequently dispensed it is best to have a definite mass in stock. This is made in large quantities. After removing the scum from the solution it is poured into suitable bottles, and when thoroughly cooled covered with alcohol to prevent it from becoming mouldy. When wanted for use the bottle is placed in a water-bath and the required quantity is poured off. The mass is made as follows :—The accurately weighed gelatin is allowed to macerate over night in distilled water and strained through a sieve. The gelatin adhering to the sieve is collected, the whole placed in a tared porcelain capsule and sufficient water added to make the weight four or five times as much as the original quantity of gelatin used. The capsule is placed on the upper ring of a retort-stand and heated over wire-gauze with a gas or spirit-lamp flame, care being taken not to burn the gelatin. The glycerin is added and the whole evaporated to the consistency mentioned in the following table :—

	I. Evap. to 60 parts.	II. Evap. to 25 parts.	III. Evap. to 50 parts.	IV. Evap. to 60 parts.	V. Evap. to 104 parts.
Gelatin .	20	10	10	10	30
Water . .	80	40	40	40	120
Glycerin .	40	15	20	30	15

The anhydrous mass No. 1 is intended for preparations kept in stock, and for those which are to retain their transparency ; mass No. 2, for hygroscopic drugs ; No. 3, for suppositories ; No. 4, for vaginal balls, ear-almonds and bougies ; No. 5, for crayons or bougies containing a large percentage of iodoform.

Bougies.—Bougies containing sulphate of zinc, sulphate of copper, nitrate of silver, extract of opium, hydrochlorate of morphine, bichloride of mercury, etc., are made as follows : one part of sulphate of zinc, or any of the above-mentioned medicaments, is first dissolved in a little water, and then added to 99 parts of mass No IV., and poured into moulds. If it is desired to make a large quantity of sulphate of copper bougies it is best to mix not more than the mould will hold at a time, because by frequently heating the mass the bougies acquire a yellowish-green colour instead of a blue-green.

Bougies of carbolic acid (5 *per cent.*), and similar medicaments soluble in a small quantity of alcohol, are made by adding 3 parts of carbolic acid, previously dissolved in alcohol, to 7 parts of glycerin and 50 parts of mass No. III.

Bougies of iodoform 50 *per cent.*, and of similiar medi caments insoluble in water and alcohol by adding 27 parts of powdered iodoform to 54 parts of mass No. V. When taken from the mould the bougies are placed in a drying closet until they weigh about two-thirds of their original weight.

Bougies of ferric chloride (5 *per cent.*), and of similar hygroscopic drugs by dissolving 1 part of sesquichloride

* Many resins have strong affinities for alkaloids and other constituents of plants. They act somewhat like animal charcoal, carrying them from solution and holding them tenaciously.

† From the *American Journal of Pharmacy*, June.

of iron in 9 parts of water, and adding to 19 parts of mass No. II.

Alum bougies (2 *per cent.*), 25 parts of mass No. III., and 10 parts of distilled water are liquefied in water-bath. To this is added a *hot* solution of 7 parts of alum, 10 glycerin and 5 distilled water. The whole is then evaporated with slight agitation to 35 parts. The mixture becomes thick and turbid on adding the solution of alum, but on heating over a water-bath and stirring carefully, the mixture soon becomes clear and transparent. *Hot water* must be added from time to time to replace that lost by evaporation.

Bougies containing tannin ·2 *per cent.*—0·66 of tannin is dissolved in 8 glycerin, and the hot solution added to 39 mass No. II., the whole evaporated to 33. The mass will coagulate on the addition of the tannin solution, but becomes clear when slowly stirred for five or ten minutes on a water-bath. By this process 2 grams of tannin may be incorporated with 5 grams of gelatin. This formula is a very good one, and yields bougies which are very soluble. Schreiber states that he has met with tannin bougies which, on boiling with water for half an hour did not dissolve.

Bougies of extract of krameria are not made with gelatin but with white glue. The requisite quantity of extract is dissolved in 40 glycerin and added to the hot solution of 15 glue in 20 water stirring constantly until the mass is evenly distributed.

Bougies of salicylate and chloride of sodium are made by adding the finely triturated chemicals to 30 parts of gelatin mass No. II.

For *rectal suppositories* mass No. III. is used excepting for hygroscopic drugs which require where possible an anhydrous mass, either No. I. or No. II.

For *vaginal balls* use about the same mass as is used for bougies. Suppositories or balls containing iodide or bromide of potassium, bromide, chloride or salicylate of sodium or ergotin require mass No. II.

Suppositories of chloral hydrate are made with gelatin mass No. II., the chloral being added dissolved in a little water.—*Phar. Rundsch.* (Prag), 1887, p. 101.

In preparing *solution of acetate of iron* Oldtmann collects the precipitated hydrated oxide of iron on a strainer and allows it to freeze; this mass after melting can be readily washed and pressed. Solution of acetate of iron thus prepared is clear and stable.

Liquor ferri dialysati as frequently obtained has not the proper specific gravity. By subjecting it to freezing temperature the water will freeze out. In this way solution of dialysed iron can readily be concentrated without decomposition.—*Phar. Rundschau*, xiii., p. 90.

THE TREATMENT OF BURNS AND SCALDS.*

BY FERD. ADALB. JUNKER, M.D.

Professor Mosetig, during the last five years, has treated with iodoform forty-eight severe cases of burns and scalds with the most satisfactory results. The danger of iodoform-intoxication in burns, he believes, is merely theoretical, as neither he nor others who treated burns with iodoform had, when using certain precautions, ever met with bad concomitant effects. The action of iodoform is twofold—it is both analgetic and antiseptic. The patients, according to Dr. Mundy's experience, which Professor Mosetig fully confirms, obtain ease a few minutes after the application of iodoform to their burns, and are soon fit to be moved. The patients, in Professor Mosetig's wards, repose quietly and without pain in their beds; they recover more rapidly, with only moderate and consequently less exhausting discharges, and with smoother cicatrices, than those differently treated; and if there is no possibility of saving the life, euthanasia at least is procured. Iodoform, although inert against the dangers to life from oligocythæmia and the nervous shock, guards against the danger of sepsis.

Professor Mosetig, differing from the majority of surgeons, uses iodoform in very limited quantities only. He either does not employ the powder at all, or when so, in rare instances, he sprinkles it by means of an insufflator in very thin layers, only on those places where the integument has been burnt in its whole thickness and has assumed a parchment-like appearance. As a rule he covers the injured parts directly with compresses of iodoform gauze, not prepared in the usual way, by thickly dusting the gauze with the powder, but by impregnating with an etheric solution of iodoform the purified gauze which has previously been freed of grease. He proceeds in the following manner: After opening and excising the vesicles, and cleaning the burns with cotton-wool, which had been steeped in a half per cent. solution of table salt, and well pressed out, he covers the wounds with dry compresses consisting of several layers of iodoform gauze, prepared as stated above, of corresponding size, which are exactly and smoothly laid over the whole surface of the injury. Over this an equally large or somewhat smaller piece of gutta-percha tissue is placed, taking care that it does not form folds or creases. The whole is wrapped in a very thick layer of medicated absorbent cotton-wool which overlaps to a great extent the compresses, or, better, surrounds the whole limb or injured portion of the body. This cotton-wool is finally fixed by several turns of bandages, which, at the same time, exert a little gentle pressure. This simple dressing, which, moreover, has the advantage of taking up very little time, is allowed to remain, without being changed, as long as possible, *i.e.*, as long as cleanliness permits, and no rising of the temperature takes place.

The secretions from the wound drain off beneath the gutta-percha tissue, and are taken up by the absorbent cotton-wool. Slight staining of the bandage is no sufficient indication for renewing the dressing, which ought to be permanent; in case of real imbibition and offensive smell, only the external dressing has to be removed and changed; the iodoform gauze, and the gutta-percha covering, however, should not be interfered with.

In case, in the meanwhile, fever should set in, which betrays by its character septic causes, generally the demarcation and separation of the mortified part having commenced, or a retention of the secretion of the wound having taken place, the dressing must be removed, the abscess opened, and free discharge of the pus secured; the mortified shreds and the eschars must be removed by means of forceps and scissors. The new dressing is put on in the same manner as the first one.

The impermeable covering of gutta-percha tissue is very essential, and ought never to be omitted, because the drying on and sticking to the wounds of the gauze, stiffened by the imbibed secretions, is always injurious and may moreover cause, like a scab, retention of the secretion. The discharges may be allowed to dry in the external portion of the dressing, but never on the wound itself.

By the permanent iodoform dressing, the infection, both by the air and by contact, is prevented, and burns of the second degree, as a rule, heal under a single dressing; in burns of the third degree, aseptic separation of the eschar, with but slight secretion, frequently takes place, and even if the latter be not the case, the granulating surfaces heal in a far shorter time, and the cicatrization is smoother, more even, and altogether less disfiguring than in non-aseptic treatment.

In burns and scalds of the face the mode of dressing described will, of course, be impossible; instead of it an iodoform-vaseline ointment (1:20) is employed, and covered with a mask of gutta-percha tissue. The ointment has to be daily renewed, and is always spread on at the thickness of a knife-blade.

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* Abridged from the *Centralblatt für die gesammte Therapie*, March, 1887; and *Wiener Medicinische Presse*, 1887, Nos. 2 and 3. Reprinted from the *London Medical Record*, July.

The Pharmaceutical Journal.

SATURDAY, AUGUST 13, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

NEW REMEDIES IN RELATION TO MEDICAL PROGRESS.

IN the address in Medicine, delivered by Dr. W. T. GAIRDNER at the Dublin meeting of the British Medical Association, reference was made to the progress of modern medicine in the direction of stability as the result of patient scientific research, and the view that a kind and degree of stability had thus been attained which was not possessed by the medical art in any previous stage of its progress was illustrated by the use of antiseptics in surgery and the present medical treatment of fevers and inflammations, as well as the use of chloroform. But taking this last named agent as the most prominent member of the class of powerful and perhaps indispensable modern remedies acting upon the nervous system, and admitting that if forty years could be regarded as sufficient for testing an advance in medicine or surgery, the introduction of the use of chloroform might safely be affirmed to have been an achievement by which the reputation of our time had been saved, he yet held that there were evils to be discounted and failures to be set against the benefits of this enormous boon to suffering humanity. As instancing this fact, Dr. GAIRDNER referred to the opinion held by well-informed persons that the lethe which comes from modern chemicals like that born of old of poppy and mandragora has been a questionable advantage to humanity at large. Whatever might be said in that sense of chloral hydrate, butyl chloral, paraldehyd, urethan and the alkaloids or condensed forms of the older narcotics so immensely convenient, but so powerful for mischief, for his own part he had no doubt the balance inclines, at least in instructed medical hands, greatly in favour of the service these remedies are doing. In his opinion there could be no doubt that by the modern use of digitalis, strophanthus and other cardiac remedies, of amyl nitrite and nitroglycerine in angina pectoris and allied conditions, and of salicyl compounds in acute rheumatism when in judicious and well instructed hands, very distinct and valuable additions to medical resources had been obtained. But while professing the most entire faith that the efforts of enthusiastic workers are being fruitfully directed towards the foundation of a science of pharmacology on the joint basis of experimental research and scientifically directed observation, too much of the transitional condition remains to allow of the use of new remedies being pointed to as the unquestionable milestones of progress and as evidence of the increasing stability of medical art. It might rather appear to some as if the multitude of new remedies which come from all the ends of the earth, the brief reputation of some of them, and the over sanguine estimation of others were proofs of an unrest quite the reverse of stability, that unsatisfied with old remedies, old prescriptions and old methods of treatment held itself bound to drive on the *currus triumphalis* of modern therapeutics at all costs, with the probability of landing once more in a series of controversies such as attended the famous work of BASIL VALENTINE on the healing virtues of antimony three hundred years ago.

Still while polypharmacy in its old and irrational form is nearly gone, and the unquestioned progress of preventive medicine during the last thirty years has been accompanied by an equally steady advance in curative medicine, a science of pharmacology or of the uses and actions of medicines, such as excited the aspirations of CHRISTISON, is now being built up upon a foundation that was never before possible, and progress in this direction may be looked to for rendering this least satisfactory department of the healing art far more secure in the future. The mere simplification of the form of remedial agents and the mitigation of the nauseous and repulsive manner of prescribing them wholesale was held by Dr. GAIRDNER to represent an advance by no means devoid of importance as regards the comfort of individual patients, the peace of families, and especially of nurseries, while at the same time the immense relief to human suffering by the use of anæsthetics rightfully employed, and even of narcotics and anodynes in improved forms, could not be lost sight of in the most brief allusion to the modern use of drugs.

THE SCHOOL OF PHARMACY.

THE discussion that took place at the last Council Meeting respecting the issue of the new Prospectus of the School of Pharmacy illustrates the watchful interest which that body continually displays in the institution that may be looked upon as the exponent of its views in respect to pharmaceutical education. As, in consequence of recent changes, this prospectus will vary in several respects from its predecessor, it may be of interest to recapitulate here briefly some of the principal novelties. The first change that will attract attention is in the list of officers of the School, where Professor BENTLEY's name now ranks after that of Professor REDWOOD as Emeritus-Professor, whilst the list now includes for the first time the name of Mr. GREEN as Professor of Botany, and that of Mr. E. M. HOLMES as Demonstrator of Materia Medica. Ample schedules

are given of the lectures on Chemistry (including the Physics of Chemistry), by Professor DUNSTAN; the studies in Practical Chemistry, under Professor ATTFIELD; the lectures on Botany, by Professor GREEN; the teaching in Pharmacy and Practical Pharmacy, by Mr. JOSEPH INCE; and the Demonstrations in Materia Medica, by Mr. E. M. HOLMES,—the whole constituting what appears to be a very complete and comprehensive course of study.

Another change worthy of notice is that in respect to the School Prizes. Botany and Materia Medica, long associated in the prize competitions, will in future, as a consequence of the recent alteration, have separate silver sessional medals and separate bronze medals for each of the five months' courses of instruction. Pharmacy will also have its own silver and bronze medals. Chemistry and Practical Chemistry will remain on the old prize footing in respect to having separate school prizes, and in common with Botany the number of Certificates of Honour awarded for those subjects will be limited, while Certificates of Merit will no longer be awarded in any case.

It may be hoped that the number of entries when the School reopens on Monday, October 3, will prove that the continued efforts of the Council to maintain a high standard in pharmaceutical education are appreciated as they deserve to be.

The Pharmacy Bill stood low down on the notice paper for Wednesday last, and not having been reached at the time the House rose the consideration of it was adjourned until next Monday.

* * *

An Ordinance regulating the practice of pharmacy in the Orange Free State, South Africa, has been passed by the Volksraad, and a translation of it appears on p. 147. It will be seen that it restricts the right "to practise as chemist, apothecary or druggist" within this State to persons over twenty-one years of age, who shall have been "admitted" by the State President upon the certificate of a Committee as to their having proved their fitness in examination, or having been engaged in the business before the passing of the Ordinance. A medical practitioner is, however, allowed to keep his own "apothecary's shop," provided that he pays for a licence according to the tariff, and serves personally or employs a registered person to do so. The fee for going before the Committee is fixed at £3, and for "admission" £4.

* * *

Sixteen years have now elapsed since the publication of the first Hungarian Pharmacopœia, and some time since the Minister of the Interior, recognizing the great changes that have occurred in the materia medica during that period, commissioned the Board of Health to take the necessary steps for producing a second edition. This body referred the work to a committee, presided over by Professor Carl Than, and consisting of Dr. Csatáry, a member of the Board of Health, Dr. J. Wagner, Dr. F. Korányi and Dr. Balogh, University Professors, Dr. L. Tóth, a University teacher, and Dr. B. Muller and Gustav Jármay, pharmacists of Pesth. This Committee has recently completed its task and has forwarded to the Minister of the Interior the manuscript, concerning which some information is given in the *Pharmaceutische Post*. From this it appears that the arrangement adopted is the alphabetical one now usually followed and that the synonymy is limited; methods of preparation of chemicals are only given where the commercial product is not pure or uniform, and the model of the Pharmacopœa Germanica is followed in many respects. The descriptive paragraphs under the headings of the chemical compounds are all divided into three or four parts: the method of preparation in cases where the chemicals can be conveniently prepared in the pharmacy, the physical properties, the tests for identity and the tests for purity. Sixty-seven articles have been selected for insertion in the second edition, but as the pruning knife has been applied somewhat vigorously, the total number, 515, will only exceed that of the first edition by four. Amongst the insertions are antipyrin, antifebrin, resorcin, cocaine hydrochlorate, caffein sodiobenzoate and sodiosalicylate, paraldehyd, paraffin, and various antiseptic surgical dressings. The manuscript is bilingual, being written in Latin and Hungarian, and it is thought that the new work will be ready in the course of the approaching autumn and come into force in the spring of next year.

* * *

From the Fourth Report of the Comptroller-General under the Patents, Designs and Trade Marks Acts it appears that during the year 1886 the business of the office increased in all its branches. The total number of applications for trade marks during the year was 10,677, as compared with 8026 in the previous year. During the same period 5421 marks were advertised and 4725 marks were registered; of these 2164 were advertised, and 1859 were registered in the class of "chemical substances prepared for use in medicine and pharmacy," showing a remarkable increase on the previous year, when the numbers were respectively 291 and 225. As indicating the result of the supervision exercised by the office over proposed registrations, it may be stated that in the same twelve months 4518 applicants for trade marks to which objections were raised were offered hearings by the Comptroller; of these 2629 accepted the objection without attending a hearing, whilst of the 1889 who proceeded to a hearing only 137 succeeded in removing the objection. The total receipts on account of trade marks during the year amounted to £8252.

* * *

In reporting upon the arrivals of gum tragacanth in Constantinople, which in the year 1886–87 amounted to 2870 cases, Mr. Consul-General Fawcet remarks that it is noticeable that, compared with former years, there has been a large excess of export of this gum to Germany and the continent and a proportionate diminution to the United Kingdom.

* * *

According to the *American Druggist* the Maranham copaiba trade is gradually being usurped by the United States at the expense of Great Britain. In 1883–84 sixty-three tons went to England and two and a half tons to the States; in 1884–85 the figures were fifty and twenty-two tons; and in 1885–86 seventeen tons went to each country. It is stated that no other country imports balsam directly from Maranham.

Transactions of the Pharmaceutical Society.

EXAMINATION PAPERS FOR THE JACOB BELL SCHOLARSHIPS, 1887.

Part I.

Time allowed, three hours (11 *to* 2).

In awarding marks the neatness and legibility of the writing will be taken into account.

NOTICE.—In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

Latin.

1. Translate into English :—

Hæc fatus, latos humeros subjectaque colla
Veste super fulvique insternor pelle leonis,
Succedoque oneri. Dextræ se parvus Iulus
Implicuit, sequiturque patrem non passibus æquis.
Pone subit conjux. Ferimur per opaca locorum,
Et me, quem dudum non ulla injecta movebant
Tela, neque adverso glomerati ex agmine Graii,
Nunc omnes terrent auræ, sonus excitat omnis,
Suspensum et pariter comitique onerique timentem.

Ænid, Lib. ii., 721—729, Arnold.

2. Parse *fatus* ; give present, perfect and infinitive of *subjecta* ; give perfect, infinitive and supine of *succedo* ; decline *onus* and *comes.*

3. Translate into Latin :—

"Take of strychnine half a grain, rub to a fine powder, and then mix with 24 grains of liquorice powder. Make into twelve pills with syrup."

4. Expand and translate :—

℞ Magnes. Sulph. . . . . ℥j.
Tinct. Card. Co. . . . . ℥j.
Magnes. Carb. Pond. . . . . ℈j.
Aq. Chlorof. . . . . ad ℥iss.
M. Ft. haust. St. primo mane, ante jent.

English.

Write a short essay on "Cork : its source and uses." Or on "The Reign of Queen Elizabeth."

Paraphrase—

"The churl in spirit, howe'er he veil
His want in forms, for fashion's sake,
Will let his coltish nature break
At seasons through the gilded pale."

Tennyson's "In Memoriam," Canto CXI.

Arithmetic.

1. How many square metres of paper will be required for a room $15\frac{1}{2}$ feet long, $12\frac{3}{4}$ feet broad, and 10·96 feet high ? A metre is 39·37 inches.

2. Add $\frac{\frac{112}{168}}{\frac{3}{84}}$ of 12 to $\frac{650}{108} - \frac{17}{36}$.

3. Multiply 5·63459 by 0·1976.

4. A tradesman bought 321 cwts. of an article at £56 3*s.* 4*d.* per ton, and sold it at £58 per ton. How much did he make by the transaction ?

French.

Translate into English :—

Le peuple napolitain à quelques égards n'est point du tout civilisé ; mais il n'est pas vulgaire à la manière des autres peuples : sa grossièreté même frappe l'imagination.

La rive africaine, qui borde la mer de l'autre côté, fait déjà presque sentir son influence, et il y a je ne sais quoi de numide dans les cris sauvages qu'on entend de toutes parts. Ces visages bruns, ces vêtements formés de quelques morceaux d'étoffe rouge ou violette, ces lambeaux d'habillements que ce peuple artiste drape encore avec art, donnent quelque chose de pittoresque à la populace, tandis qu'ailleurs l'on ne peut voir en elle que les misères de la civilisation. Un certain goût pour la parure et les décorations se trouve souvent à Naples à côté du manque absolu des choses nécessaires ou commodes.

Mme de Staël.

German.

Translate into English :—

Die Blumen im Garten unter meinem Fenster dufteten stärker. Düfte sind die Gefühle der Blumen, und wie das Menschenherz in der Nacht, wo es sich einsam und unbelauscht glaubt, stärker fühlt, so scheinen auch die Blumen, sinnig verschämt, erst die umhüllende Dunkelheit zu erwarten, um sich gänzlich ihren Gefühlen hinzugeben und zie auszuhauchen in süszen Düften.

Part II.

Time allowed, two hours (3 *to* 5).

Chemistry and Pharmacy.

1. Give the formulæ for Oxide of Silver and the Oxides of Mercury of the B.P. ; state how they are prepared, and the effect of heat on each.

2. What weight of Carbonic Acid Gas can be obtained from 7 kilogrammes of Creta Præparata ?

3. What are Alums ? Give examples.

4. State the B.P. process for Adeps Præparatus, and the tests for its purity.

5. How is Sp. Ammon. Arom., B.P., prepared ?

Botany.

1. Describe the structure and contents of a young cell, and define Parenchyma, Prosenchyma, a Pitted Cell, and Spiral Vessel.

2. Describe three types of regular Polypetalous Corollas, giving familiar examples.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 3rd instant, at the Society's rooms, 11, Harcourt Street, Dublin, at three o'clock.

The President (Mr. William N. Allen) in the chair.

The others members of the Council present were the Vice-President, Mr. Draper ; Mr. J. A. Brunker, M.A., Dr. Collins, Dr. Montgomery, Professor Tichborne, Mr. Charles Evans, Mr. Beggs, Mr. Grindley, Sir George Owens, Mr. Simpson, Mr. Hayes and Mr. Wells.

Mr. Charles Evans returned thanks to the Council for having elected him a member.

The President said that before they proceeded with the business mentioned on the agenda paper, he wished to make a few remarks relative to one of the reports of the proceedings of the last meeting of the Council which had appeared. The manuscripts of that report furnished by their reporter had been looked over in the usual way by himself (the President) and also by the Vice-President, so as to prevent names connected with prosecutions from appearing. These names were all carefully erased. Nevertheless, in the *British and Colonial Druggist*, the report appeared giving one of the erased names. He wrote to the editor of that journal about it, and in reply received the following letter :—"Sir,—In reply to your inquiry of the 20th instant (July) your reporter omitted the name, but as it is not our practice to publish incomplete reports, and as I knew who the complainant was, I repaired the omission." In connection with the matter he (the President) received a letter from the gentleman whose name was introduced into the report containing the following postscript :—"I am surprised that my communication to the Council should be made known to the parties concerned, from some quarter I know not, but they got the tip." He (the President) wished to take the opinion of the Council as to what course should be pursued in the matter.

Mr. Brunker : Mr. President, I think that in this case the editor of the paper in question has done what

he ought not to have done. He published a report which was not the report forwarded to him from the official source of this Society. During the three years that I was president I always revised the reports, and frequently I merely drew my pen through whole pages of Mr. Macartney's manuscript, trusting to the honour of those to whom it went that they would not publish what was evidently intended not to be published. In this case it appears from the letter of this gentleman that he inserted in the report which was forwarded to him matter which he had no right to insert. I beg to move that in consequence no further reports of our proceedings be sent to that particular journal.

Mr. Grindley: I second that motion.

Professor Tichborne: I think it is a serious thing to do, there being no notice of the proposal on the paper.

The President said the matter did not affect their own official organs. They only supplied reports to two journals officially. The journal in question was one to which their reporter had been merely permitted to supply a report.

Professor Tichborne said he thought it a dangerous precedent to act in the matter without a notice on the paper. It would be better to acknowledge the letter and consider it afterwards.

The President: But are you going to supply reports to that journal in future?

Dr. Montgomery: I would not.

The Vice-President: It is an ordinary matter of business. Is this gentleman to be trusted or not? The idea of postponing it for even a week where a man has been dishonourable enough to do this! I would not postpone it for a moment. We do not know what is the next thing he would do.

Dr. Montgomery: Could we come at how he got the name?

The President: It was in the report.

Mr. Brunker: He admits that he got it from another source.

Mr. Brunker moved—

"That in consequence of the unauthorized report of the proceedings of a meeting of the Council, which appeared in the *British and Colonial Druggist* of July 23, no further reports be sent to that paper."

Mr. Grindley seconded the motion, which was put and carried *nem. con.*

A letter was received from a candidate who had failed to pass the last examination for the licence, stating that he was only short in a few marks through nervousness, and requesting that the Council would not oblige him to wait for six months, as that would necessitate the closing of an establishment which had been for many years carried on by his late father and would also prevent him from becoming a candidate for an appointment now vacant.

Sir George Owens said he knew the applicant to be a very deserving young gentleman, who had very creditably passed the "Assistants' examination" in the Apothecaries' Hall. The Council could not enter into his marks at the examination he failed to pass, but they might allow him to get an examination after a couple of months.

Dr. Montgomery: Has the Council power to review the examination?

The President: We have no power.

Dr. Montgomery: Then there is no use in discussing it.

Sir George Owens: Have we not the power of letting him into another examination?

The President: Not before six months.

A letter was received from one of the Secretaries of the forthcoming British Pharmaceutical Conference asking that the names of the delegates from the Pharmaceutical Society of Ireland who would attend that Conference should be furnished.

The names of Professor Tichborne, Mr. Simpson, Mr. Wells, Mr. Minchin of Athy, Mr. Brunker, and Mr. Beggs were ordered to be sent.

A donation was received from the King and Queen's College of Physicians in Ireland of a copy of the register of that college for 1887.

On the motion of Mr. Wells, seconded by Mr. Charles Evans, thanks were voted for the donation.

On the motion of the President, seconded by Mr. Simpson, it was ordered that a press should be provided for the examiner in chemistry, for the purpose of storing reagents.

On the motion of the President, seconded by the Vice-President, it was ordered that the amount of the policy of insurance on the furniture and fittings of the Society be increased by £100.

The next business was the election of an examiner in practical pharmacy. There were two candidates, Mr. John Evans, L.A.H., and Dr. Charles F. Knight, Master in Surgery and Obstetrics, Queen's University, etc.

Mr. Brunker moved that Mr. John Evans be appointed. They wanted a gentleman who was accustomed to the dispensing bench as his daily occupation.

The Vice-President said he had great pleasure in seconding the motion.

Mr. Hayes said he had great pleasure in supporting it. The brother of the present candidate had conducted examinations to the entire satisfaction of the Council.

Mr. Simpson said he also had great pleasure in supporting the motion. Mr. John Evans was a thoroughly practical man, and would, he had no doubt, act as an examiner as satisfactorily as his brother had done.

The motion was unanimously carried.

A report from the Law Committee was submitted, and a resolution passed thereon.

On the motion of Mr. Hayes, seconded by Mr. Simpson, Mr. Charles Evans was added to the Law Committee.

The following gentlemen were elected members of the Society:—Mr. George Phillips, L.P.S.I., 67, Great Brolam Street, Dublin; proposed by Mr. Simpson and seconded by Professor Tichborne. Mr. Thomas Randolph Shannon, L.P.S.I., 17, Upper Merrion Street, Dublin; proposed by Professor Tichborne and seconded by Mr. Simpson.

Some financial business having been disposed of, the Council adjourned.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

Recent Researches on Meteorites.

BY PROFESSOR DEWAR, M.A., F.R.S., M.R.I.

(*Concluded from page* 84.)

To clear up this matter still further, about 10 grams of the original nodule were digested with pure ether in the way described by Lawrence Smith for extracting the hydrocarbon-like bodies. It was allowed to stand for twenty-four hours with excess of ether, and then filtered, and washed with more ether. The graphite thus treated was dried at 110° C., and the gases extracted from it.

For the purpose of comparing one of the terrestrial graphites with the above in regard to its behaviour with ether, the specimen of unknown origin was selected, as yielding the largest quantity of marsh-gas. The residue, after digestion with ether, was dried, and the gases pumped out as before.

It will be seen that by this treatment with ether the volume of gas given off by the celestial graphite, and also the marsh-gas, have been reduced to rather more than one-half, while with regard to the unknown graphite, although the total volume of gas remains about the same (probably due to a rather higher temperature being employed), the marsh-gas has also been reduced to rather less than one-third the original amount, and the hydrogen has correspondingly increased.

These experiments prove that either the ether did not

dissolve out all the actual carbonaceous compounds present, or that the marsh-gas was subsequently formed during the heating of the graphite.

As Dr. de la Rue had kindly placed at Professor Dewar's disposal a splendid specimen of the Orgueil meteorite, the opportunity was taken of comparing the gases occluded by this typical specimen of the carbonaceous class with those obtained from the stony meteorites and the graphites. This meteorite has been so thoroughly examined by Clöcz and Pisani (*Compt. Rend.*, vol. lix. (1864), pp. 37, 132), with regard to its chemical inorganic constituents, that nothing need be said as to its general composition. The investigation was therefore confined to the gases given off on heating which had not previously been determined.

	Occluded gases in vols. of the graphite.	CO_2.	CO	H.	CH_4.	N.
Celestial graphite before treatment with ether . . .	7·25	91·81	—	2·50	5·40	0·1
Celestial graphite after treatment with ether . . .	3·50	81·50	10·63	1·41	2·12	0·74
Unknown graphite before treatment with ether . . .	7·26	50·79	3·16	2·50	39·53	3 49
Unknown graphite after treatment with ether . . .	7·15	64·86	5·67	14·37	12·96	2·00

During the heating of the meteorite a large quantity of water, on which floated numerous small pieces of sulphur, collected in the bulb tube immersed in the freezing mixture. This water was strongly acid, and indeed smelt strongly of sulphurous acid. On evaporating it to dryness with a drop of hydrochloric acid, abundance of ammoniacal salts were found in the residue. In the cool anterior part of the combustion-tube a considerable sublimate had collected, which proved to be principally sulphate of ammonium with traces of sulphides and sulphites, and a large quantity of free sulphur. A very large quantity of gas was given off, having the following composition :—

	Sp. gr.	Occluded gases in vols. of the meteorite.	Percentage composition.				
			CO_2.	CO.	CH_4.	N.	SO_2.
Orgueil meteorite	2 567	57·87	12·77	1 96	1·50	0·56	83·00

Sulphurous acid is evidently the main constituent of the gases given off ; but if this gas, which has been formed from the decomposition of the sulphate of iron, be eliminated, the meteorite yields 9·8 times its volume of gas, having very much the same composition as that from some of the stony meteorites, viz :—

CO_2, 76·05 ; CO, 11·67 ; CH_4, 8·93 ; N, 3·33.

Clöez found the organic matter in this meteorite to be composed of carbon 63·45, hydrogen 5·98, oxygen 30·57, which is nearly in the proportions of a terrestrial humus substance. It is known that such substances break up by the action of heat into gases of the nature found above, at the same time, however, a quantity of the carbonic acid undoubtedly comes from the presence of the carbonates of magnesium and iron. The operation by which terrestrial carbon has been changed into graphite is by no means clear. As a rule, the transition of one kind of carbon into another necessitates the action of a very high temperature. If, therefore, a really high temperature is in all cases necessary, it is difficult to explain how compounds of carbon came to resist decomposition, and should come to be found associated with all natural graphites.

It may be assumed that the graphite resulted from the action of water, gases and other agents, on the carbides of the metals, and that during the chemical interactions which took place, a portion of the carbon became transformed into organic compounds.

In either case it points to the conclusion that the method of formation of the meteoric and terrestrial graphites was similar, and it is perfectly possible they may, after all, have come from a common source.

It is proposed to continue this investigation, and, in order to acquire further information, to examine the gases given off from meteorites at definite temperatures, and especially the gases from such as can be found coated with an impervious glaze, and to examine more particularly into the presence of water in such bodies, and the source of the nitrogen found in the same.

Since the above analyses of different graphites were made, a sample of the artificial graphite which results from the action of oxidizing agents on the cyanogen compounds present in crude caustic soda has been examined. The following analysis shows that this artificial variety of graphite is characterized by giving a very large yield of marsh-gas.

CO_2	45·42
CO	39·88
CH_4	4·43
H	8·31
N	2·00

Occluded gases in volumes of the graphite = 53·13.

Meteorites, no doubt, have an exceedingly low temperature before they enter the earth's atmosphere, and the question had been raised as to what chemical reactions could take place under such conditions. It resulted from Professor Dewar's investigations that at a temperature of about −130° C. liquid oxygen had no chemical action upon hydrogen, potassium, sodium, phosphorus, hydriodic acid, or sulphydric acid. It would appear, therefore, that as the absolute zero is approached even the strongest chemical affinities are inactive.

The lecturer exhibited at work the apparatus by which he had recently succeeded in solidifying oxygen, where a copper tube is seen passing through a vessel kept constantly full of ether and solid carbonic acid ; ethylene is sent through this tube, and is liquefied by the intense cold ; it is then conveyed by the tube, through an india-rubber stopper, into the interior lower vessel ; the outer one is filled with ether and solid carbonic acid. A continuous copper tube, about 45 feet long, conveying oxygen, passes first through the outer vessel, and then through that containing the liquid ethylene ; the latter evaporates through the space between the two vessels, and thus intense cold is produced, whereby oxygen is liquefied in the tube to the extent occasionally of 22 cubic centimetres at one time. The temperature at which this is effected is about −130° C., at a pressure of seventy-five atmospheres, but less pressure will suffice. When the oxygen is known to be liquid, by means of a gauge near the oxygen inlet, the valve is opened, and the liquid oxygen rushes into a vacuum in the central glass tube below ; some liquid ethylene at the bottom of the next tube outwards is also caused to evaporate into a vacuum at the same moment, and instantly some of the liquid oxygen in the central tube becomes solid, owing to the intense cold of the double evaporation. The outer glass vessel serves to keep moisture from settling on the sides of the ethylene tube. By means of the electric lantern and a lens, an image of this part of the apparatus was projected upon the screen, this being the first time that the experiment had been shown on a large scale in public

Performing the experiment, the temperature reached was a little below 200° C., that is only 50° to 70° above the absolute zero of temperature, and in the experiment about 5 lbs. of liquid ethylene were employed.

With reference to the main subject, the lecturer said that meteorites came from regions of intense cold into our atmosphere; most of them weigh but a few ounces or pounds, but exceptional meteorites weigh several hundredweight. A spherical body 3 feet in diameter, moving at the rate of 18 miles a second at the height of 23 miles, where the barometric pressure is only two-tenths of an inch, produces locally a compression pressure 5600 times greater than that of the surrounding air. Descending vertically, it would pass through the whole atmosphere in 15 seconds. The velocity stated in these data is relatively low as compared with that of planetary bodies. Meteorites travel at the rate of about 36 miles in a second. The velocity of a shot from a 100-ton gun is about half a mile per second.

Meteorites reach the earth covered with a thin and very remarkable glaze, due to the fusion of their external surface during their brief passage through the atmosphere. A velocity of 145 feet per second in air gives an increase of 10° temperature, and the rate continues as the square of the velocity. The surface temperature of a body moving at the rate of 39 miles per second would reach 2,000,000°.

The lecturer placed a piece of iron against a rotating emery wheel, the friction of which caused showers of sparks to be thrown out. These were so hot that some of the little globules of iron composing them were fused into a plate of glass placed to catch them. Great similarities exist between the flight of these globules and the flight of meteorites, the heat and light in both cases being partly due to friction and partly to chemical action. That chemical action has an influence, he proved by applying oxygen gas to the sparks, thereby causing them to burn more brilliantly, and by applying carbonic acid to them, thus reducing their brilliancy. When a piece of meteorite was applied to the emery wheel in place of the piece of iron, the sparks were far less abundant, and of a dull red colour. The glaze of meteorites can be imitated to some extent by cooling a piece of meteorite to 200° C., and then dropping it for a moment into the electric furnace; the temperature explains the glazing of a meteorite, and that it has a motion of rotation must also be considered in estimating the amount of friction, and therefore of heat, to which it is subjected in its passage through the atmosphere of the earth. An enormous amount of its energy, however, is expended in heating the air, and aërial vibrations thus set up explain the noises made by the passage of meteorites.

What is the origin of the gases in meteorites? Their presence agrees with the discovery of Dr. Huggins, that comets give a hydrocarbon spectrum. The origin of terrestrial graphite is far from being agreed upon by geologists; in some places it is evidently transformed coal, in other cases they cannot say whether it comes from vegetable or primitive sources. Whatever the origin of the graphite in meteorites, it contains similar impurities to those in terrestrial graphite; the nodules in celestial graphite are similar to those of terrestrial graphite, and might as well have come from some body like the earth as from any other source. Another conclusion is that the marsh-gas is not occluded in meteorites, but is a product of distillation by heat, just as the gas might be distilled from shales. The graphite of meteorites has no power of occluding marsh-gas, therefore the inference is that the marsh-gas and hydrogen in them are the result of the decomposition of organic bodies. In the spectrum of one of the comets, Dr. Huggins once photographed a peculiar band in the ultra-violet, which band indicated the presence of cyanogen. One meteorite on the table contained chloride of ammonium, therefore it contained a compound of nitrogen, and such would account for the production of cyanogen.

THE EAST INDIA ASSOCIATION.

The Commercial Products of Siam.

BY O. WEYNTON.

In a paper on "The Commercial Products of Siam," read before the East India Association on the 7th of April, the following information was given respecting articles of more or less interest to pharmacists:—

To most people the province of Assam is an utter *terra incognita*. Those tolerably well up in Indian geography may possibly be able to point out its position on the map, describing it, generally, as the north-eastern frontier district of India, separated from our most recent acquisition of Upper Burmah by the semi-independent state of Manipùr and the wild hill-tracts lying north and south of that country. Of course the general public have heard of Assam tea, but beyond that commodity, few have the faintest idea of the vast and varied indigenous wealth lying undeveloped within Assam's political boundaries.

India-rubber (*Ficus elastica*).—For this plant such portions of an estate should be selected where the soil or nature of the ground indicates to be unfitted for bringing under cultivation with prospect of immediate return, cutting small paths thirty feet apart, intersecting one another at right angles; the lower such portion lies without partaking of a swampy character the better, and dense shade is desirable though not actually necessary; the nature of the soil is a small matter. The portion should be carefully mapped, the paths cut quite straight, and, where they intersect one another, slips of this vine (*Ficus elastica*) should be planted. The vine is abundant in the ravines, and although the main stems will be found to have been *blazed* most unmercifully, the new shoots are always vigorous, strong, and strike easily; each should be some three to four feet long, placed upright, if possible against a jungle-tree, and about one foot inserted in the ground; a notch cut some four inches from the inserted end will facilitate striking, and although the slips may be planted at any time during the year, the most suitable season is March, just after the usual hail-storms have moistened the ground. The slips may be left to nature, but as time goes on, pretty constant supervision will be requisite during the cold weather, especially if the land is near the hills or in the vicinity of the villages in the plains, for in either case poaching may be expected, and the jungle-roaming nomads, both Aryan and non-Aryan, will most certainly tap the shoots if they get the chance; but as the gum exudes only in the cold weather, and cannot be removed under twelve hours after incision, it is not an arduous undertaking to capture pilferers. In five or six years the vine will have attained sufficient size to be independent of shade other than that afforded by its own foliage, and the surrounding forest may be utilized, if need be, for other plants or purposes. In twenty-five years it may be tapped in moderation, not by mercilessly *blazing* the branches, but by scooping the earth from beneath the stoutest lateral roots—the parts subjected to incision being washed entirely free from soil, and a common earthen *gurrah* placed beneath to receive the gum, care being taken that sufficient space is left between the incision and mouth of the receptacle to admit of the free circulation of air, but at the same time, so as to prevent the admixture of sand, twigs and leaves. These details may seem over elaborate; but the purer the gum the higher the price. Vines of the age mentioned may safely be tapped to the amount of one maund the first year; that is 82 pounds avoirdupois of clear gum during the three months of December, January and February. Each successive year an additional ten pounds may be taken, but they will require watching, and should signs of exhaustion become apparent, such as sluggish exudation and drooping leaves, the incision should be closed and the roots earthed up; but then matters must be left to the judgment of the cultivator, and unless incising the trunk and branches is

resorted to, there need be little fear of having to stop collecting during the season. The yield given is only approximate. I once took eight maunds from a vine that had escaped the attentions of the Meekers, in a remote ravine near the Kopoli river, which I estimated as near as I could to be about sixty years old, and as a plantation of *Ficus* would enjoy all the advantages that this plant had, being allowed to attain full vigour and maturity, there is no reason to doubt that similar results, in proportion to age would be obtained. Roughly estimated, an acre would contain forty-seven trees; hence, if the reader cares to work out the calculation, at the present price per pound, 2*s*., he will find, allowing a wide enough margin for freight, collecting, etc., that an acre, only thus partially occupied, would return something over £300 per annum in the twenty-fifth year. A quarter of a century seems a long time to look forward to, but presuming that a hundred acres had been put under *Ficus* when the rush to Assam for tea investment took place, just twenty-five years back, many private proprietors would be in a vastly different position from that they now occupy. The Italians have a proverb that "He who would grow rich should plant an olive." The Assam settler may substitute for the olive—*Ficus* slips.

The Lac Insect; *Coccus Lacca*.—The curious little insect that produces the lac and lac dye of commerce abounds in all the terai jungle, being more abundant and of the best quality in the neighbourhood of the Khassia Hills, and that mountain chain. It is also found on the north side of the Assam Valley proper, as likewise under the Tipperah Hill south of Sylhet and Cachar, but from the last-named locality is inferior in size, being also in other respects less desirable. In its native state it is found encrusting the branches of a variety of shrubs about four feet from the ground, and in the densest underwood, so that, for successful propagation dampness and shade are requisite; these conditions may easily be had, and the profits of the cultivation, if such a term is permissible, are so handsome as fully to warrant sufficient outlay to attain them. I shall confine myself to one acre in dealing with each item, but of course the operator can suit himself as to area, though it is as well to caution enthusiasts as to the proverb of "putting all the eggs into one basket." Though the insect seems to have no predilection for any particular bush, the Meekers, who have, so to speak, domesticated it, have ascertained that the urhur dhàl shrub rears it in the best manner, and though experiments may hereafter demonstrate that other trees are as suitable, we may take the urhur as our propagating means. It is quite unnecessary to enter upon a description of this shrub as it is known, and the pulse it produces eaten all over India. In fact the plant will grow almost anywhere, and could the lac insect accommodate itself to every clime in which the dhàl thrives the enormous amount produced would soon overstock the market, but it cannot exist in dry arid parts, hence the advantage Assam, and similar humid countries, has and is likely to maintain. Seedlings of the urhur, though abundant, are difficult to collect, each *bustec* or homestead raising just sufficient for its own necessities, so it must be raised in your vegetable garden for the purpose, and as to attain the biggest tree in the shortest possible time is your object, high cultivation must be resorted to. If sown and well watered in November the young plants will be fit to plant out at the close of the following rains—the end of October, and should then be good stout saplings, averaging four feet in height. When planted in rows four feet by eight apart, about 1360 will go to the acre, and if well cultivated will be found quite ready to receive the insect exactly two years from the date of first sowing. To cover an acre of ground with wire netting may seem a costly proceeding, so those who do not care to incur that expense may substitute bamboo trellis-work, but I recommend starting with wire at the outset. Birds, especially the *bulbub*, are particularly destructive, so some protection is absolutely necessary. There is another enemy to be guarded against, the ant, the big red and black ones, as also the smaller species; hence the stem of each tree a little way from the ground should be furnished with a grummet of jute, which it will be necessary to keep moist with petroleum. November is the time to get your stock lac, but arrangements should have been made earlier in the season; say August. The lac must be soft and pliable, otherwise the insect will be dried up in the cells and useless. About half a maund, or forty pounds, will be found sufficient for one acre, and though the cost for fresh material may amount to a rupee a seer (2 lbs.), it is well worth the expense, for once stocked you are independent. The best method of conveying the lac to the factory is in baskets well lined with fresh plantain leaves, and as very little motion causes the insect to leave the cells, the packing should be torn in strips and wound in and about the branches of the dhàl, while if any appear on the baskets the latter should be broken up and secured to the limbs of the tree, into the forks of which lumps of *lac* must be stuck until a uniform distribution over the whole plantation has been accomplished. Almost daily the increase of the cell formation can be noted; first a streak of crimson draws out from the pieces of lac, which, if inspected with a magnifying glass, will be found to be a column of insects; they gradually deepen in colour and increase in size, each forms a cell and rapidly begins to exude the tough horny substance, until by the end of the rains it becomes necessary in many cases to support the branches weighed down by the incrustation. If the insect has been left undisturbed and the shade properly attended to, three years from the commencement of operations and one from the introduction of the insect, each tree will yield an average of eight pounds of lac, which when freed from extraneous matters, such as twigs and leaves, and the dye washed out, will give six pounds per bush of clean seed lac, the present price of which in the London market at 40*s*. per cwt. gives £144 per acre, less charges such as initial cost, upkeep, freight, etc.; but if care is taken to leave sufficient nucleus on the branches this sum may be looked for annually without the expense of re-stocking. In preparing lac for the market it is pounded up small and then washed in plastered wooden tanks, about the size of two tea-chests thrown into one; while rubbing and macerating the lac a few pinches of unslacked lime thrown into the water will greatly help the precipitation of the dye. After it has been washed thoroughly clean it should be dried under shade, packed in chests of 56 or 112 pounds and sent direct to London; and as there is a growing preference among dealers and manufacturers for seed lac in lieu of shell lac the expense of converting the former into the latter need not be attempted. Unfortunately lac dye is now a drug in the home market, having been ousted by the cheap aniline preparations, but in these whirligig days of constant commercial revolution, as there is no telling but what a demand for it may again spring up, I mention the method of preparation:—When the seed lac has been removed from the tank all scum should be carefully taken off and the dye allowed to settle for twenty-four hours; the water may then be drawn off and the sediment put into trays of about two inches deep, two feet long and eighteen inches in breadth, the sides and ends having slots cut down to the bottom every three inches. As the dye dries it must be lightly pressed down and divided by string drawn through the slots, thus portioning the dye into cakes of three inches square by one deep. Under no account must metal come in contact with lac during the process of manufacture. Under present circumstances the dye may be sent to Calcutta and put up without reserve, as native dyers still make use of it; also a trade may be opened in it with Munnipoor and the hills, and eventually Burmah, but these details must be left to the consideration of the investor.

Indigo.—The neglect of this plant by Assam planters

can only be accounted for by the blind devotion to the one object with which they came to the province, the higher bheel land and drainable swamps between the teelahs possessing, as they do, a soil admirably adapted for the growth of the plant, while the heavy dew that falls up to the end of February would bring it to maturity by the middle of May. The abundant water supply available from the numerous springs and streams, moreover, would supply artificial irrigation—should such be deemed advisable—so that the plant might be cut and manufacture finished ere the regular rains set in about mid-June.

Arrowroot, Tapioca and Sago.—Although these three are indigenous their commercial value is so small that, though a patch of the two former may be kept for household consumption and seedlings of the latter may be scattered about the unused portions of the grant, unless they can be placed, in a manufactured state, free on board, at about a penny per pound, it would not pay to devote any further attention to their preparation. Under present circumstances they can be had cheaper as importations from London, and undertaking the preparation of them to supply any local demand, inexpensive as such preparation is, must be determined by close calculation as to whether "the game is worth the candle." For exportation they must be turned out by the ton, small quantities will not pay, any more than would matchmaking by the box.

Ginger and Turmeric.—Both of these tubers, if well cultivated, highly manured and treated with care in the preparation for market, can be grown at considerable profit. Each is reared in a desultory manner in almost every village, but so little care is bestowed upon the culture and drying that the minimum price is obtained in the local bazaars, and wholesale dealers would hardly take notice of them. Generally speaking, the roots when taken up receive but a superficial washing, are then smeared with fresh cow dung and hung in baskets or spread on trays among the rafters of the native huts, the ever-ascending smoke doing the rest. The result is that the out-turn presents a most uninviting aspect, dirty, shrivelled, and, despite the almost constant smoke, the dried tubers are invariably riddled with the bamboo-borer insect. If on being dug out the tubers of ginger are thoroughly well scrubbed in water with a hard brush until every earthy particle is removed and then steeped for a night in a pretty strong solution of lime water (one ounce of unslacked lime to the gallon), then well rinsed in clean water and dried slowly in a brick oven at a temperature of 140° to 160°, it will command a price closely approximating the best Jamaica ginger; this was ascertained some twenty years ago in the case of some samples so treated on one of the Sylhet plantations. Though ginger may be had, as stock, from almost any village, the best is procurable from the bazaars frequented by the hill tribes under the foot of the hills. As ginger is a bulky article it might be worth while to consider the advisability of extracting the essence and confining dealings in it to that.

Turmeric may be treated in the same manner, omitting the bleaching by lime water, and sent to the best market ruling prices indicate. There is another tuber that might be cultivated with great advantage and profit, but having regard to the climate in which it is found I doubt very much whether it could be raised in the plains of Assam. I allude to the *Salep misree* brought round by the Afghan fruit pedlars every cold weather. Dried to an almost adamantine consistency in its journey from Balk, that retailed by the traders may be presumed to have lost its vitality and the extreme difficulty of procuring anything direct from Afghanistan precludes all hope of getting it thence; but, under the name of "little men's bread," it is known to the Badaghurs of the Neilgherries and may be procured either from the Botanical Gardens at Ootakamund or from planters on that plateau. It is best germinated in damp flannel until the eyes begin to protrude, when it may be planted in well earthed ridges, kept moderately moist, and shaded until the leaves appear; it is fit for lifting in a twelvemonth. Though unknown in Europe and almost entirely so to any of the medical profession who have not served in the East, it possesses most wonderful vivifying properties, and has been famous throughout Persia for ages as a stimulative in cases of extreme prostration. Once introduced, its value would become apparent and a highly remunerative price commanded. It reproduces about eight tubers from one, maturity being indicated, as with arrowroot, by the drying up of the leaves. Should it not be found suitable to the plains it would, I am convinced, succeed at Shillong or any other station at an elevation of over 2000 feet outside the rain-belt; my own observations in the Neilgherries leading to the conclusion that any rainfall in excess of 100 inches would induce rot.

Though many economic plants will doubtless suggest themselves to the intending establisher of what may be called an *omnium* plantation, and nothing need be said to deter one from introducing them, it would be better to defer their planting until the place is well stocked with indigenous ones of ascertained commercial value, ere experimentalizing with exotics, the successful rearing of which must be at least speculative.

Aniseed and anise star are both to be found in abundance in Assam, the one under the name of Mahori, the latter under that of Badian. Among the low hills round about Gowhatti, on the old road to Cherraponjee, and in the terai forest of both sides of the Khassia and Naga hills, sufficient seedlings of aniseed for stocking an acre can be easily procured, but considerable care is required in transporting them, and this should be done during the cold weather, the plants lifted with as much earth round the roots as can conveniently be carried. As the object with the former plant is to obtain as luxuriant a foliage as possible, high cultivation and copious manuring should be resorted to; the plant may be put in 4 feet by 4—the same distance as tea is planted; but if that part of the district in which the grant is situated is more than ordinarily subject to visitations of blight and red spider, it will be prudent to plant somewhat wider—say 5 by 5; for though tea leaves afflicted with the two pests mentioned make but little perceptible difference in the turn-out (not out-turn), the quality of the oil of aniseed will be very sensibly affected by the presence of unhealthy leaves, hence the aniseed plantation must be kept clean and in good order. To get the largest yield from the plant, pruning with that view may be carried out as experience dictates, and the best treatment followed with tea will probably be found to answer. The plant readily responds to the use of the knife, and will yield, weight for weight, about 50 per cent. above tea, so that the usual task for plucking may be increased in proportion. The leaves should be gathered precisely as with tea, but removed from the plucking baskets *more often*, for no heating must be permitted, and plucking should only take place in dry weather. The leaf may be subjected with advantage to a light rolling in the mass just sufficient to break the cells and the oil then pressed out, or may be extracted by distillation; but whichever method is pursued, both press and still should be enamelled or of polished iron and kept scrupulously clean, as on the clearness of the oil and freshness of the leaves depends its price. It may then be sent to market either in small casks or bottles, and as numbers of the latter can be always purchased for an almost nominal value in the districts, for the first consignment or two their use would, perhaps, be preferable; but of course all these matters need careful calculation as to cost.

Anise star or Badian, the object with which is to procure the largest amount of fruit (or seed)—which latter is not quite the correct term—will require that class of manure that contains the greatest amount of phosphates. Hence pulverized limestone, bones, and animal or fish

offal will be best for it, and as all these can be had at small cost, large crops may be secured; although the chief dependence should be placed on the fruit, the bark of Badian is almost equally rich in properties peculiar to the shrub. Both seeds and bark may be lightly crushed and then infused in spirits of wine or distilled in the usual manner. The large demand all over Europe and America for anisette for flavouring purposes would tend to make this particular industry a considerably remunerative one. Packing, for export, must depend upon circumstances; but, as this is a choice article, well corked and sealed bottles are to be recommended. It is as well to mention that the flavour of the preparations from both these plants is so pungent and penetrating, that the house set apart for their manipulation should be kept distinct from all buildings devoted to other manufactures, and that the few people it will be necessary to employ in the aniseed business should be retained for that special purpose. Natives are proverbially careless in these matters, so that strict vigilance to prevent interchange of the tea and aniseed baskets must be specially guarded against. Scented tea is all very well in its way, but, impregnated with the powerful odour of anisette, would find scant favour either with dealers or the general consumers.

Andropogon Schœnanthus, or *Ghundho bina*, as the Bengalis term it, is a small stunted-looking shrub that is found under the hills on the south side of the two valleys that now form Assam. It is well known in Ceylon and Southern India, and from its fresh-gathered leaves is distilled the lemon-grass oil of commerce. In its native state the Ghundho appears an unpromising plant from which to expect any large yield of leaf, but when well manured and cultivated it responds to generous treatment, and will well repay those who care to raise it. The pruning is much the same as that demanded for other leaf-producing crops, and, though even the coarse, tough, older leaves are impregnated with the essence and yield largely, care must be exercised to avoid over-plucking, as the plant needs considerable lung power, and if unmercifully taxed will soon die out and have to be replaced. It is better allowed to attain 6 feet in height ere plucking, when it will be sufficiently robust to withstand close cropping, but as soon as signs of exhaustion, such as drooping of the lower leaves, become apparent an interval of rest should be accorded. It should not be touched from October to April, and only on bright warm days. If fire is used the heat must be low, but a brighter and clearer oil is obtained if a glass retort is made use of, so arranged as to revolve slowly in the full beams of the sun that the mass of leaf may be kept constantly turning over, otherwise a disposition to "cake" is induced, and the out-turn is streaked with unsightly films of dark muddy lines that will detract considerably from its market value. The plant may be propagated from layers, cuttings, or separation of the roots, but is sufficiently abundant to provide independent saplings for stock without recourse being had to the above somewhat tedious methods of multiplication. As this is an essential oil, and the produce of your experimental acre will not amount to any large quantity, either bottles or half-maund tins may be used for the first exportations. The refuse, after all oil has been extracted, being liable to ferment and become offensive, should be burnt and consigned to the general ash-pit, the sifted lye from which will be found the best thing to use for cleaning all oil presses, retorts, etc.

(*To be continued.*)

Parliamentary and Law Proceedings.

Orange Free State Pharmacy Ordinance.

Ordinance No. 2—1887.

The Volksraad of the Orange Free State, taking into consideration that it is desirable to make provisions with reference to the admission of apothecaries, chemists and druggists in this State, ordains as follows:—

Art. 1.—Any person who has been apprenticed under written contract for not less than four years to any admitted doctor, apothecary, chemist or druggist, and is of the age of twenty-one years, shall be admitted by the State President to practise as chemist, apothecary or druggist within this State, when he has a certificate from a Committee of professional men consisting of three members, that he has passed his examination before such Committee, and that this Commission recommends his admission.

Art. 2.—The indentures mentioned in the previous Article, or a certified copy thereof, shall, within one month of the signing, be deposited in the office of the Registrar of Deeds, and registered.

Art. 3.—Each candidate before such examination must deposit the sum of £3 sterling with the Committee, and every admission shall bear stamps of the value of £4 sterling.

Art. 4.—Any person who has already been admitted in a foreign country as an apothecary, chemist or druggist, or those who have passed an examination as such in a foreign university or other lawful institution, and who wish to be admitted in this State, shall approach the Committee mentioned in Article 1, who shall examine his diplomas, and shall, if deemed necessary, examine him, and as the case may be, shall grant him a certificate as mentioned in Article 1.

Art. 5.—The provisions of Article 2 shall also have effect on persons mentioned in the previous Article.

Art. 6.—Nothing in this Ordinance shall prevent admitted doctors from keeping their own apothecary's shop if they pay the licence fixed by tariff, provided such doctor serves personally or employs such admitted apothecary, chemist, or druggist, as is set forth in this Ordinance.

Art. 7.—Such admitted doctors, and the persons admitted according to Articles 1 and 4, shall lawfully carry on the business of apothecary, chemist or druggist, after they have taken out the licence fixed by the law.

Art. 8.—Any person, who may be admitted in accordance with the provisions of this Ordinance, contravening any of its stipulations, shall be punished by the Landdrost Court on conviction by a fine not to exceed £50, or in default of payment, imprisonment not exceeding three months.

Art. 9.—The provisions of Articles 1 and 2 are not to apply, so far as the previous written contract is concerned, or to apprentices who are, at the time this Ordinance comes into operation, bound or apprenticed to any admitted doctor, apothecary, chemist or druggist, provided that of such apprenticeship a written deed be made within three months after the publication of this Ordinance stating, amongst other things, the period for which such apprentice has already served, which deed then, as previously stipulated, must be deposited with the Registrar of Deeds, and then registered.

Art. 10.—All laws in opposition to this Ordinance are hereby repealed.

Art. 11.—This Ordinance shall have force of law immediately after publication in the *Gouvernements Courant.*

Review.

Laboratory Calculations and Specific Gravity Tables. By John S. Adriance, A.B., Fellow of the Chemical Society.*

These tables are intended by the author to save the student, as well as the analyst, much of the laborious calculations attending chemical operations. With regard to the student, the labour attached to the calculations of

* New York: John Wiley and Sons. London: Trübner and Co. 1886.

his results is by no means thrown away, and perhaps, in most cases, it would be rather to his disadvantage to have this labour saved him by reference to a table; but the practical chemist may frequently save a considerable amount of time by means of some of these tables, and will find their arrangement convenient for reference. In a good many cases, however, the labour saved is scarcely sufficient to repay the trouble of looking out the tables, as, for instance, in the very elaborate tables for the comparison of Centigrade, Fahrenheit and Réaumur thermometers, or those for the conversion of grams into grains, etc., etc.

Tables which will be found much more useful include those of the molecular weights of all the common salts (calculated on the atomic weights according to Professor Clarke), percentage composition of salts, conversion of degrees Beaumé into specific gravities, factors for saccharometer indications, factors for the conversion of the products weighed in analysis to the corresponding elements or radicles sought, etc.; in this latter table the quantities are given for from 1 to 9 parts respectively, but this seems an almost superfluous elaboration, as, if the co-efficient for 1 part were given, it would amount to practically the same thing to multiply that by the figure obtained as to look out each figure separately.

A large proportion of the collection consists of tables of the specific gravities of solutions of salts of different strengths, over sixty different salts being thus given. Many of these, of course, are of frequent use, but the greater number would only be required for technical purposes, and their value is lessened by the fact that they are given for temperatures varying between 15° and 25°, and in many cases, such as iron and copper sulphates, it is not stated whether the figures apply to the anhydrous or crystallized salt.

Tables for correcting the volume of CO_2 evolved by HCl, and of N evolved by hypochlorite solution, for the amount of gas remaining dissolved by the solution, as well as for temperature and pressure, the tension of mercury and water vapours, the density and comparative volume of mercury and of water at various temperatures, and many other useful data are included. But there are several omitted, which would, if included, have added considerably to the utility of the book. We should like, for instance, to have seen tables showing the proportions of NaCl and KCl in a mixture of these titrated by $AgNO_3$ solution, and others for the dilution of alcohol and a comparison between proof degrees and percentage of absolute alcohol, and perhaps a table of boiling and melting points as well.

The figures given appear to be carefully revised and thoroughly reliable, though in one or two places, by an oversight, density is described as *grains* in 1 c.c. The work is interleaved with blank pages to allow of any memoranda being jotted down, and has a good index, rendering reference easy.

Obituary.

Notice has been received of the death of the following:—

On the 16th of July, Mr. John Stewart, Chemist and Druggist, 18, Turnpike Lane, Hornsey, N. Aged 59 years.

On the 24th of July, Mr. Maslin Kelsey Lowther, Chemist and Druggist, Langtoft, Yorkshire. Aged 40 years. Mr. Lowther was an Associate of the Pharmaceutical Society.

On the 25th of July, Mr. William Squire, Pharmaceutical Chemist, Swinefleet, Yorkshire. Aged 59 years. Mr. Squire had been a Member of the Pharmaceutical Society since 1853.

On the 27th of July, Mr. Jonathan Potter, Chemist and Druggist, Dudley Grove, Harrow Road, W. Aged 56 years.

On the 28th of July, Mr. William Henry Creek Giddings, Pharmaceutical Chemist, Dunstable. Aged 46 years. Mr. Giddings had been a Member of the Pharmaceutical Society since 1864.

On the 9th of August, Mr. Henry Walton, Chemist and Druggist, 311, Chester Road, Manchester. Aged 32 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A Disclaimer.

Sir,—I find that the charge of being a "cutting chemist" and at the same time a member of the Council of the Pharmaceutical Society, which was hurled against some person unnamed (and was therefore incapable of being answered) by Mr. Whittle at the Annual Meeting, is now in plain language directed against Mr. George Frederick Schacht, pharmaceutical chemist, 52, Royal York Crescent, Bristol.

The person who thus, in a letter to the *British and Colonial Druggist*, makes so free with my name prefers to withhold his own.

I shall put the kindest interpretation possible upon his action and assume that he believes in the truth of what he states; but to prevent the repetition of what is quite a mistake, I beg you will allow me to declare once more what I have already publicly announced, that I retired from the firm "Giles, Schacht and Co." on July 1, 1886, the date on which the change of system was commenced, and that since that day I have neither exercised any control in its management, nor received one shilling of its profits.

For a time, however, I continue (at the desire of my late partners) to manufacture the preparations with which my name has been so long associated.

Consequently, I have never "cut" in my life.

G. F. Schacht.

North British Branch Executive—Is it a Committee?

Sir,—The discussion at last meeting of the Council raises the above important question.

Both the President and Mr. Bottle seem to hold the idea that the North British Branch Executive is merely a Committee.

I observe that in your issue of July 30, and again in that of last week, you also designate this Executive as a Committee.

In opposition to such a view, I might be allowed to point out—

1st.—That the North British Branch Executive essentially differs from all committees appointed by the Council, in that it is not appointed by the Council, but is elected by members of the Society resident in Scotland.

2nd.—That although it was at first proposed to call the body, who manage affairs in Scotland, by the title of a Committee, this name was not retained; that of the "Executive of the North British Branch" being substituted (*Pharm. Journ.*, Nov. 6, 1886). This title was conceded, and the name Committee dropped, in deference to the wishes of the Scottish members, which were laid before the Council by a deputation from Scotland, sent to confer with the Council anent Scotch affairs.

As this point raises others of importance, I trust that you will allow me a portion of your valuable space to draw attention to it.

Edinburgh. Claude F. Henry.

A. H. B. (Dublin).—The deposit formed appears to be due to the neutralization of ammonia by the hydrochloric acid, and unless the iron preparation contained more than the usual proportion of ammonia, such a deposit would always cause the mixture to appear turbid. The addition of a few drops of ammonia would make the mixture clear, but strictly speaking that would not be admissible, though some ammonium chloride would be formed in any case.

Communications, Letters, etc., have been received from Messrs. W. E. Crow, D. B. Dott, Botanist.

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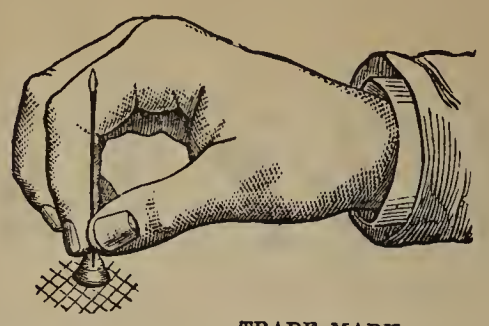

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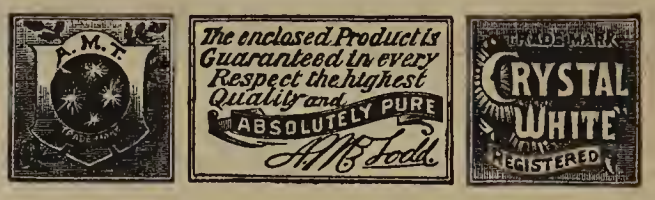

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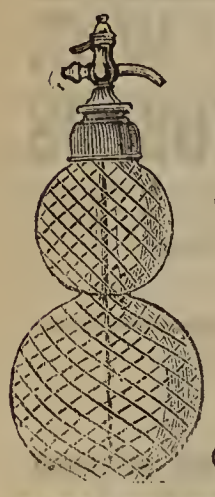

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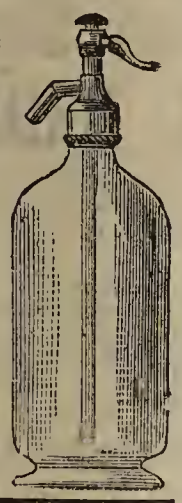

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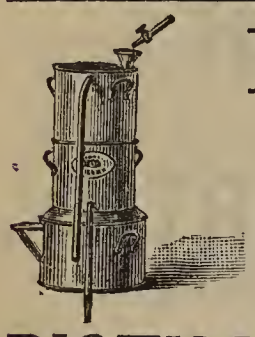

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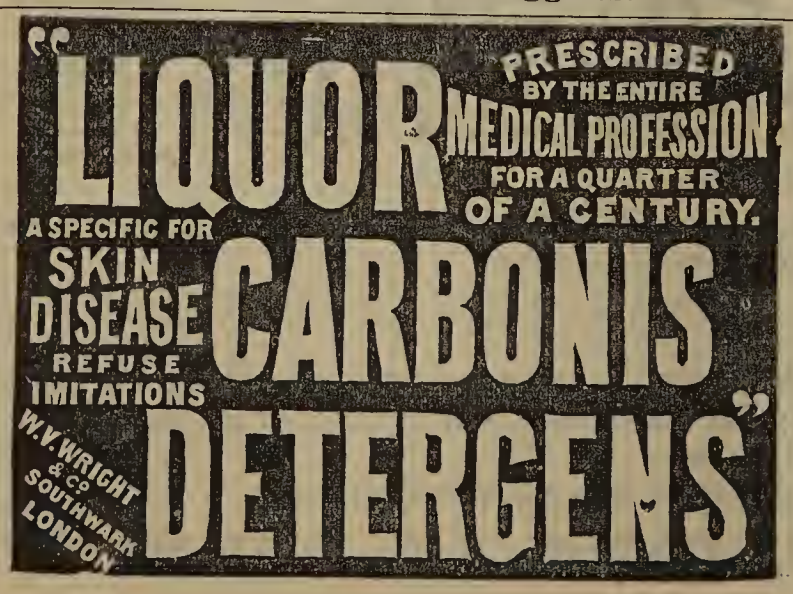

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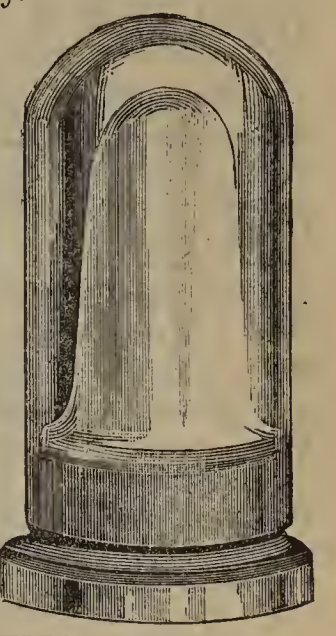

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,, T. Birkett, Workingt'n	,, T. Clough, Liverpool

All at their first attempt.

DURING THE SESSION

The following have passed from this School :—

Major.

Mr. W. H. Clubb, Liverp'l	Mr. H. Wyatt, Bootle
Mr. J. W. Lang, Southport	

Minor.

Mr. H. Aspinall, Liverpool	Mr. T. Clough, Liverpool
,, W. Bentley, Lancaster	,, C. E. Hanslow, Woodford
,, T. Birkett, Workingt'n	
,, E. G. Bond, Liverpool	,, E. Jones, Portmadoc
,, T. W. Carr, Knaresbro'	,, J. E. Jones, St. Asaph
,, G. M. Gass, Whitehaven	,, B. Phillips, St. Clears
	,, A. Stephen, Liverpool

Preliminary.

Mr. J. H. Griffiths, Little Brighton	Mr. J. H. Marples, Birk'h'd
,, A. A. Jones, Liverpool	,, H. E. Sawden, Liverp'l
	,, W.H.Warhurst, Liverpl

Apothecaries' Hall—Mr. J. W. Whitely, Gainsborough.
Jacob Bell Scholarship—Mr. W. A. Salter, Birkenhead (one of the Bell scholars for next session), is a member of the Chemistry and Pharmacy class.

NOTE.—*All that have been sent in for (a) the Major, (b) the Preliminary, and (c) the Apothecaries Hall during this session have passed.*

The next session will commence on Monday, Sept. 5, 1887. Those desirous of joining the October or December Classes should enter at once. New Syllabus, with full particulars of Classes, Fees, &c., sent free on application.

Victoria University.—An Entrance Examination in Arts (introductory to the Faculty of Medicine) will be held at Owens College, Manchester, and at University College, Liverpool, in September, beginning on the 26th.

Applications for admission must be made (in writing) on or before September 12th, to the Registrar, by whom further information will be sent.

Full particulars as to Degrees, Examinations, and Courses of Study in the Faculty of Medicine will be sent on application.

Copies of examination papers are printed in the University Calendar, published by Mr. J. E. Cornish, Manchester, and Messrs. Macmillan & Co., London (price 1s., by post 1s. 3d.).

A. T. BENTLEY, M.A.
Manchester, August, 1887. *Registrar.*

Owens College, Victoria University, MANCHESTER. PHARMACEUTICAL DEPARTMENT.
The classes at the College qualify for the Pharmaceutical Society's Examinations. Full particulars will be forwarded on application to H. W. HOLDER, M.A., Registrar.

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The WINTER SESSION of 1887-88 will commence on OCTOBER 1, when an Introductory Address will be delivered by R. W. REID, Esq., F.R.C.S., at 3 p.m.

Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

All Hospital appointments are open to students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several medals.

The fees may be paid in one sum or by instalments. Entries may be made to lectures or to Hospital practice, and special arrangements are made for students entering in their second or subsequent years, also for dental students and for qualified practitioners.

Several medical practitioners and private families residing in the neighbourhood receive students for residence and supervision, and a register of approved lodgings is kept in the secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

R. W. REID, Vice-Dean.

THE MANCHESTER COLLEGE

OF CHEMISTRY AND PHARMACY,

225 and 227a, OXFORD ST., MANCHESTER.

The next Session, being the **Tenth** of Mr. TURNER'S work as a Teacher, and the Fifth of his occupation of these Rooms, will begin on August 29 for September 1.

At the July Minor Examinations, the **Nine** undernamed students passed from this School :—

Mr. M. CHARLESWORTH, Saltaire.
„ W. S. ALVEY, Nottingham.
„ G. AIREY, Manchester.
„ W. DRINKWATER, Patricroft.
„ E. R. PATER, Newark.
„ C. A. HIGGINS, Cheetham Hill.
„ A. FIELDSEND, Penistone.
„ R. MCKIE, Blackburn.
„ H. ENGLAND, Hyde.

Two others passed in June, viz. :—

Mr. S. SOUTHAM, Manchester.
„ F. RIDEAL, Hyde.

Portman School of Pharmacy.

156, MARYLEBONE ROAD
(Close to Baker Street Station).

The following Classes are held for Pharmaceutical Students:—

DAY CLASS.—Including all subjects.

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Prospectus, with revised scale of Fees, on application to

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Consulting Physicians—Sir Andrew Clark, Bart., LL.D., F.R.S., and Dr. Ramskill.
Consulting Surgeons — Mr. Curling, F.R.S., Mr. Jonathan Hutchinson, F.R.S.
Physicians—Dr. Langdon Down, Dr. Hughlings Jackson, F.R.S., Dr. Sutton, Dr. Fenwick, Dr. Stephen Mackenzie, Dr. Sansom, Dr. Charlewood Turner, Dr. Gilbart Smith, Dr. Warner, Dr. Ralfe.
Assistant Physician—Dr. James Anderson.
Surgeons—Mr. Couper, Mr. Rivington, Mr. Waren Tay, Mr. McCarthy, Mr. Frederick Treves.
Assistant-Surgeons — Mr. Reeves, Mr. C. Mansell Moullin, Mr. Hurry Fenwick, Mr. F. S. Eve.
Obstetric Physician—Dr. Herman.
Assistant Obstetric Physician—Dr. Lewers.
Ophthalmic Surgeons—Mr. Waren Tay, Mr. F. S. Eve.
Physician to the Skin Department—Dr. Stephen Mackenzie.
Aural Surgeons—Dr. Edward Woakes, Mr. T. Mark Hovell.
Surgeon-Dentist—Mr. Barrett.

LECTURERS.

Medicine—Dr. Stephen Mackenzie.
Surgery—Mr. Rivington.
Operative Surgery—Mr. Rivington.
Practical Surgery—Mr. Reeves.
Anatomy—Mr. Fredk. Treves.
Practical Anatomy—Mr. Mansell Moullin.
Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Chemical Physics—Mr. F. J. M. Page.
Comparative Anatomy—Mr. C. Mansell Moullin.
Pathology—Dr. Sutton.
Pathological Histology—Mr. Eve.
Midwifery—Dr. Herman.
Toxicology—Dr. C. Meymott Tidy.
Botany—Dr. F. Warner.
Medical Jurisprudence—Dr. Sansom.
Practical Chemistry—Mr. F. J. M. Page.
Materia Medica—Dr. Prosser James.
Diseases of the Eye—Mr. Waren Tay.
Diseases of the Ear—Dr. Edward Woakes.
Diseases of the Throat—Mr. T. Mark Hovell.
Anatomy and Pathology of the Teeth—Mr. Barrett.
Emeritus Professor of Medicine—Sir Andrew Clark, Bart., F.R.S.
Emeritus Professor of Surgery—Mr. Jonathan Hutchinson, F.R.S.

The SESSION 1887-88 will commence on Saturday, October 1st, 1887. The New Buildings, which were opened by their Royal Highnesses the Prince and Princess of Wales on May 21st, afford more than double the accommodation which was provided formerly.

Fee for Lectures and Hospital Practice, 90 guineas in one sum, or 100 guineas by three instalments.

The Hospital contains nearly 800 beds. Number of In-patients during 1886 was 8,743 ; Out-patients 80,591.

The Resident and other Hospital Appointments are free to full Students. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, one Accoucheurship, and one Receiving-room Officer ; Dressers and Maternity Assistants also reside in the hospital.

The holders of all the Resident Appointments are provided with rooms and board entirely free of expense.

Two Entrance Science Scholarships, value £60 and £40, and two Buxton Scholarships, value £30 and £20, will be offered for competition at the end of September to new Students.

The Letheby Prize, value £30, for proficiency in Chemistry.

A Scholarship, value £20, in Human Anatomy and Physiology, to first-year's Students.

A Scholarship, value £25, in Anatomy, Physiology, and Chemistry, to second-year's Students.

A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

A Duckworth Nelson Prize, value £10 (biennial), in Clinical Medicine and Surgery.

The Hutchinson Prize, value £35 (triennial), in Clinical Surgery.

Prizes, value £60, to Dressers of Out-patients in Minor Surgery.

Special Classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London, and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England, are held throughout the year.

Special entries for Medical and Surgical Practice are made.

The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, Metropolitan District, East London, and South Eastern Railways have Stations within a minute's walk of the Hospital and College

For prospectus and particulars apply, personally or by letter, to

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THE CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, 175 & 177, Marylebone Road, N.W.

At the Examinations held in London in July, **4** Major Candidates from this School presented themselves. **All** passed, viz.:—

Mr. Brumwell.	Mr. Davis.
,, Coleman.	,, Wokes.

Out of **25** Minor Candidates who presented themselves in July from this school the following **21** passed:—

Mr. F. G. Acton.	Mr. A. W. Hanson.
,, W. Batchelor.	,, R. H. Jackson.
,, H. W. Brassington.	,, J. Jenkins.
,, E. M. Carruthers.	,, W. B. Lister.
,, A. W. Cox.	,, J. Metherell.
,, W. G. Duck.	,, H. J. Owen.
,, H. Ferryman.	,, W. A. Shera.
,, R. Glendinning.	,, J. H. Stewart.
,, J. H. B. Green.	,, J. R. Strick.
,, J. E. B. Grice.	,, H. O. Thomas.

Mr. J. Wilkes.

The next session will commence on Thursday, September 1st. Fee to the October examinations, six guineas; to December ten guineas. For Prospectus apply to

Mr. JOHN WOODLAND, 173, Marylebone Rd., London, N.W.

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Director: Dr. MUTER, M.A., F.R.S. Ed., F.I.C., F.C.S., &c.

Established 1st October, 1868.

THE TWENTIETH SESSION, 1887-8,
Will commence on the 12th September.

A class of Students not going up in July will meet on the 18th August for October; there will be room for two or three more to join them.

For Fees, &c., apply to W. BAXTER, Secretary.

TO STUDENTS ATTENDING WILLS' COLLEGE.

RESPECTABLE and comfortable Apartments. Terms (no extras):—Bedroom, with partial board, 13s.; ditto, with full board, £1; bedroom and sitting-room, gas and attendance, 14s. Highly recommended by Students who have passed. Mrs. Smith, 37, Trinity Sq., S.E.

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FEES. { To the October Examination ... ... £6 6s.
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12 Months' Course (Minor and Major), £15 15s.
Preliminary, £1 1s. per month.

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The annexed Pass-lists speak for themselves, and are a more reliable guide than flattering advertisements in enabling Students to decide at which school they can prosecute their studies with the greatest success.

APRIL, 1887.

MAJOR.

Mr. J. L. Armitage. | Mr. P. Watson.

MINOR.

Mr. A. E. Beard.	Mr. R. G. Hindle.
,, H. R. Broad.	,, E. Jeffery.
,, J. E. J. Bunn.	,, T. Kittow.
,, F. L. Carter.	,, J. E. Mallinson.
,, R. C. Davenport.	,, W. Pescod.
,, E. Edwards.	,, G. E. Rose.
,, F. Everingham.	,, R. F. Scott.
,, J. H. Filmer.	,, C. R. Sharman.
,, J. W. Franklin.	,, J. H. Smith.
,, W. E. Goodwill.	,, A. R. Taylor.
,, A. S. Glover.	,, A. E. Walker.
,, A. W. Hankinson.	,, G. H. Wilkinson.
,, J. B. Harris.	,, Jno. Wright.

JUNE & JULY.

MAJOR.

Mr. H. E. Lance. | Mr. F. J. Sansom.

MINOR.

Mr. G. J. Baldwin.	Mr. J. T. Palmer.
,, R. A. Bellamy.	,, E. Parker.
,, J. Bostock.	,, F. J. Parker.
,, N. H. Broomfield.	,, J. Parry.
,, J. A. Caswell.	,, W. Price.
,, J. Chapman.	,, H. Roberts.
,, R. Driffield.	,, J. Shaw.
,, W. E. Gray.	,, S. Shillcock.
Miss J. Hart.	,, A. C. T. Smith.
Mr. W. Hucklebridge.	,, H. L. Spink.
,, C. C. Islip.	,, A. Tharp.
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,, A. H. King.	,, J. R. Tite.
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,, W. Markham.	,, M. A. L. Tothill.
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TO MINOR STUDENTS.

COMPLETE sets of JUDD'S LITHOGRAPHS (7 in number) can now be had, post free, 6s., published 10s. 6d. ; single copies of any book can also be had at reduced prices, Mr. Judd having given up teaching through ill health. For further particulars, send stamp. H. JUDD, 30, Regent Sq., W.C.

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AS ASSISTANT, in London, with time for study and lectures. 6 years' experience. Would give services for comfortable home. W. FOTHERBY, Stoneyholme, Burnley, Lanc.

AS ASSISTANT in good provincial house. Age 23. Major qualification. First-class reference. WATSON, 31, Carholme Rd., Lincoln.

MANAGER or TEMPORARY. Age 40. London and provincial experience. Disengaged in September. G. B. M., Marlboro' Villa, Maidenhead.

AS JUNIOR or IMPROVER. Age 20. 4 years' experience. A. H., Rose Hill, Ash-next-Sandwich, Kent.

WELL educated youth, age 15, who has passed Preliminary, wishes Apprenticeship to good business, where he would have comfortable Christian home, and be thoroughly instructed. A. SCRIVENER, Witham, Essex.

JUNIOR. 4 years' good experience. In-doors. Please state terms. Age 20. R. R. JONES, Bocffardden Wen, Llanfaethlu Valley, Anglesey.

AS ASSISTANT. First-class London experience. Disengaged. Highest references. Minor qualification. Age 23. CHEMIST, Welburn, York.

DISPENSER to Surgeon or Institution. Can visit, &c. Full hospital curriculum. Good testimonials. PHYSICIAN, Pomeroy's, Chemist, Poole.

A QUALIFIED DISPENSER would like an engagement for about 2 months (with a little leisure for reading), either with a Medical Man or Chemist. Accustomed to Retail. Good references. B. B., 8, Baker St., W.

ASSISTANT or MANAGER. 12 years' town and country experience. Minor and Hall qualifications. Out-door preferred. NEMO, 134, Cromwell Rd., Peterborough.

ASSISTANT or DISPENSER. Temporary or permanent. Age 23. Good experience and references. Disengaged. CHEMIST, 245, Goswell Rd., E.C.

JUNIOR. Age 22. 6 years' experience. Good references. Out-door, and Midlands preferred. A. G. WOOD, Screveton, Bingham, Notts.

AS MANAGER, by a thoroughly competent man. 17 years' London and provincial experience. Single. Qualified. Good Prescriber. M., W. R. Wright, Chemist, Chatteris, Cambs.

OUT-DOOR situation. Good experience. London and Country. G. PHILLIPS, 208, Bute St., Cardiff.

ENGAGEMENTS WANTED.

ASSISTANT or to MANAGE BRANCH. Out-door. Age 25. Prescriber, Tooth Extractor. AQUA, 134, Newcastle St., Hulme, Manchester.

LOCUM TENENS, or to MANAGE BRANCH. Experienced. Suburbs or Sea Side. X, The Larches, Trinity Rd., Upper Tooting, S.W.

ASSISTANT. Age 25. 7 years' experience Disengaged. ROBERT WEBSTER, Hambleton, Selby.

JUNIOR. 5 years' experience. References. Passed Preliminary. Height 5ft. 10in. Disengaged September 1st. LEECH, Mr. Charrington, Chemist, Lichfield.

YOUTH (17), educated, tall, passed Preliminary exam., wishes to article himself to a chemist. Would give four years' services and premium of £50 for instruction, comfortable home, board, and laundry. Address, DISPENSER, 988, Messrs. Deacon's, Leadenhall St.

ASSISTANT. Age 28. 10 years' experience in Dispensing, Prescribing, and light Retail, accustomed to shipping business. Now disengaged. Could manage branch. CALABAR, 130, Long St., Sparkbrook, Birmingham.

ASSISTANT or MANAGER of branch. Age 30. Single. Abstainer. Not passed Minor. Disengaged. In or out-door. Good Prescriber and Tooth Extractor. K., 32, King Henry's Walk, Mildmay Pk., London, N.

AS ASSISTANT. Over 8 years' experience. T. WOODCOCK, St. Andrews Plain, Norwich.

A STUDENT attending evening classes desires board and residence with a chemist or surgeon, in return for services during the day. Highest references. Address, ANALYST, 296, Messrs. Deacon's, Leadenhall St.

AS SENIOR or ASSISTANT, in good business (out-door), or would manage a BRANCH. Good general experience in first-class London and provincial business. Age 27. Major. CHEMIST, 2, Carr Lane, Hull.

ASSISTANT.—JAMES OSBORNE, Medical Pharmacy, Ashbourne, will be glad to recommend a late apprentice as ASSISTANT. State salary offered and full particulars.

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MANAGER or otherwise. 39. Good Prescriber. R. C., Heathfield, Winton, near Bournemouth.

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AS ASSISTANT or DISPENSER, for few weeks. Age 28, Height 5ft. 8in. Good experience and references. HENRY WALKER, Spalding.

JUNIOR. Town or country. 8 years' experience. R., No. 6, Sherwood St., Mansfield, Notts.

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AS IMPROVER. Registered Pharmaceutical Student. Age 20. 18 months experience in Pharmacy and Dispensing. Highest reference. LANKFORD, Westbury-on-Trym, Bristol.

JUNIOR. Age 20. 4½ years' experience. Height 5ft. 8in. Good references. J. A. SARGENT, 200, High St., Lincoln.

ENGAGEMENTS WANTED.

ASSISTANT, age 22, wants partial employment for 2 or 3 months. J. M, 28, Dalberg Rd., Brixton, S.W.

AS ASSISTANT. Qualified. Age 22. N., 5, Bramerton St., Chelsea.

HOSPITALS, Surgery or Counter trade. Any distance. DENTIST, 24, Delhi St., N.

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AN English ASSISTANT. Apply to LONDON DISPENSARY, Biarritz, France.

A GOOD JUNIOR, for Dispensing and light Retail, Sept. 20th. Full particulars to N. M. GROSE, Swansea. Applications not answered in three days declined.

IMMEDIATELY.—A Junior ASSISTANT. Out-door. Age about 20. Apply, stating particulars to J. & H. G. AVERILL, Pharmaceutical Chemists, Stafford.

A QUALIFIED ASSISTANT, to manage branch business. Salary £50 to £60. In-door. Must have good references. Apply personally if possible, or enclose carte to ALLSWORTH & Co., 290, Clapham Rd., S.W.

SMART, active ASSISTANT wanted. Apply with references and photo., to THOS. EASTAWAY, 107, Old Town St., Plymouth.

MR. PADWICK, Pharmaceutical Chemist by examination, Redhill, Surrey, has a vacancy for a pupil in or out-door. Every facility for acquiring a thorough knowledge of Dispensing and good class Pharmacy.

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AN out-door ASSISTANT. Reply, stating terms, reference and qualification, to J. STEWART, 389, High St., Cheltenham.

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AN ASSISTANT in a cash business. About 20 or 21. Apply, with salary required, references, and other particulars to F. SWIFT, 33, Chatsworth Rd., Clapton Pk., London, E.

ASSISTANT for good general country business. From 22 to 25 years. Good references indispensable. Competent and trustworthy abstainer, and one seeking permanency preferred. Send photo (to be returned), age, salary, references, ADAMS, Messrs. Barron, Squire & Co., ush Lane, London.

ASSISTANTS WANTED.

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JUNIOR or IMPROVER. Must be quick, intelligent, and have first-class references. One who has just completed his apprenticeship in a good general business. Churchman and abstainer preferred. Address, enclosing carte, to Messrs. JOHN KEMP & Co., Chemists, Lincoln.

EARLY in September, Senior (Major) ASSISTANT, for first-class Dispensing business. A permanent engagement to a steady and reliable man. Apply by letter, with full particulars, ALLCHIN, Trustees, England Lane, N.W.

A COMPETENT ASSISTANT, not under 28, out-door, in a good class Family and Dispensing business. He must be an accurate Dispenser. Good address, and passed the Minor examination. Apply, with full particulars, carte, salary required, &c., to CHEMICUS, 9, King's Parade, Cambridge.

A JUNIOR ASSISTANT, accustomed to good class Retail and Dispensing, by Sept. 1st. Send usual particulars and carte (returned) to W. F. NEWMAN, Pharm. Chemist, 8, Market Street, Falmouth.

WHOLESALE. An experienced DRYMAN wanted. Address, with usual particulars, stating age and salary required, to ZEMA, care of G. Street & Co., Cornhill, London.

PILL COATER. An experienced Hand wanted for a permanency. None need apply who cannot turn out a good quantity of first-class work, and produce satisfactory testimonials. Address, PILLS, care Meggeson & Co., Miles Lane, London, E.C.

A JUNIOR ASSISTANT, accustomed to good class Retail and Dispensing. Apply personally, if possible, to F. W. KENT, Pharmaceutical Chemist, East Moulsey, Hampton Court.

IMMEDIATELY.—A competent ASSISTANT, out-door, with some knowledge of Wholesale. Must be thoroughly trustworthy, and references bear the strictest investigation. Also a Temporary ASSISTANT for the country. Apply personally, 55, Fore St., City.

JUNIOR ASSISTANT, where ample time for study can be had, in pleasant country village. One just completed apprenticeship wishing to work up for examination just suitable. Send photo, references, and terms, to MEDICO, 8, St. Peter's St., Derby.

UNQUALIFIED SENIOR or JUNIOR. Not under 20. For Light Retail and Dispensing business. One only kept. Please state reference, salary, age and height, and enclose carte (to be returned) to WILLIAM DOLMAN, Bath Rd., Cheltenham.

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A THOROUGHLY trustworthy ASSISTANT as senior. Recent testimonials indispensable. Must be well up in dispensing, and of good general experience. Age about 30. Unmarried. In-doors. Comfortable home. Apply with terms, references, and recent photo, if possible to R. B. SANDILAND, Pharmaceutical Chemist, Leominster.

ASSISTANTS WANTED.

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AN old-established BUSINESS, with branch. Net profit £1000 per annum. Price £3000. Address CARDAMOMS, Messrs. Maw, Son & Thompson, Aldersgate St., E.C.

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MESSRS. BERDOE & CO. have for transfer:—CHESHIRE. Good class Retail and Dispensing. Returns £1000. Handsomely fitted and well stocked. £600. DERBYSHIRE. High class Dispensing. Returns £850. Net profit £350. Price £700. RAMSGATE. Handsomely fitted Retail. Returns £500. Price £350. SUFFOLK. Retail and Prescribing Trade. Returns £750. Rent £30. Good house, ¼ acre garden. Only £600. DEVON. Retail and Prescribing. Returns £400 by Assistant, capable of being doubled. Rent low. Price £350. LONDON, N.W. Handsome corner. Returns £1000 by manager. Only £525. N. Main road, well fitted, Retail. Making £300 net profit. Price £550. S.E. Neglected Retail. Returns £4 weekly. Has done £8. Only £65. For details, apply, 30, Jewry St., Aldgate, City.

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Plate-glass sponge-cases, fig. A 41, 65s.; ditto, ditto, as fig. A 43, 95s.; show-steps, A 37, 50s., as fig. A 39, 15s.; desk and glass case, A 31, 60s.; a ditto, ditto, 50s.; a number of dispensing-screens, from 5ft. to 8ft. long, glass case at each side, with silvered plate-glass in centre and marble slab in front, tablets on top of cases and shelves at back for dispensing bottles, very elaborate, from £6 10s.; a 3ft. ditto, as fig. A 54, 45s.; 3ft. 6in. ditto, 55s.; 4ft. ditto, ditto, 60s.; 4ft. 10in. ditto, 70s.; 5ft., as fig. A 55, 95s.; 6ft. ditto, £5 10s.; 6ft. 6in. ditto, £6; 7ft. ditto, £6 10s.; and a quantity of other screens very cheap; several pair specie jars, royal arms, equal to new, from 24in., price £4; carboy, 16 gallons, with mahogany stand; a number smaller sizes; dome-covered pink ointment jars, gold labelled, any names, 3s. 9d. each; a lot of second-hand green, blue, 3 and 4 lb., 23 4-lb. blue ointment jars, 40s. the lot; ½-gall. displacement apparatus, fig. 53; black store bottles, with japanned caps, 1s. 3d. each.—E. NATALI, 207, Old Street, London, E.C.

12ft. wall-fixture, drawers, lockers, shelving, cupboards, and cornice, £8 10s.; 16ft. wall-fixture, mahogany, silvered plate-glass cupboards between shelving, glass labels and glass knobs to drawers; several others; 9ft. wall-case; 10ft. ditto, ditto; 15ft. ditto, ditto, £18; a number of solid mahogany-top counters, framed and moulded, pine stained and polished fronts, from 5ft. to 12ft. long, at 6s. per foot run; also a number of black and gold fronted counters, with mahogany tops, at 6s. per foot run; 12ft. mahogany counter, £7 10s.; a plate-glass case-fronted counter, 12ft. long, £9 10s. E. NATALI, 207, Old Street, E.C.

A number of flat glass cases, various sizes, from 2ft. 6in. to 6ft. long, as fig. 2, to open at back, to be sold very cheap to make room; also a number as fig. 3—2ft. long, 30s.; 2ft. 6in. long, 32s.; 2ft. 8in. long, 35s.; 3ft. long, 40s.; 3ft. 6in. long, 45s.; as fig. A 8, 5ft. long, 95s.; 6ft. long, £5 10s.; as fig. A 15, 8ft. long, £7; 5ft. long, £4 10s.; as fig. A 16, 3ft. long, 55s.; 3ft. 6in. long, 60s.; 3ft. 9in. long, 65s.; 4ft. long, 70s.; as fig. A 17, 4ft. long, 75s.; as fig. A 18, 5ft. long, £5; 6ft. long, £5; tooth brush cases, as fig. A 9, 35s.; as fig. A 10, 50s.; silvered plate glass in ebonised frame, 7ft. by 2ft. 6in., 50s. E. NATALI, 207, Old Street, London, E.C.

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NOTICE TO CREDITORS.
FREDERIC A. COLE, Deceased.

ALL Persons having any CLAIMS or DEMANDS against the Estate of FREDERIC ABRAHAM COLE, late of Colchester, in the County of Essex, Chemist, deceased (who died on the 10th day of July), are requested to send particulars thereof to me, the undersigned, Solicitor for the Executors of the deceased, on or before the 20th day of AUGUST instant.—Dated this 8th day of August, 1887.

ALEXANDER M. WHITE, Solicitor.
50, North Hill, Colchester.

TOWN HALL AVENUE, BOURNEMOUTH.

A Shop to Let, suitable for a Chemist or Druggist. Apply to JAMES H. MOORE, Bournemouth.

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4. ESSEX.—Good town. Retail and DISPENSING, with some Prescribing. Returns last year nearly £600. Large 8-roomed house. Rent £55. Good garden and warehouse. Price £430.
5. OXFORDSHIRE.—Good class BUSINESS. Returns £850, rapidly increasing. Capital position and good house. A gentleman with knowledge of Homœopathic business would find this a specially good investment. About £700 required.

WANTED.

WANTED.—Partnerships or first-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly. Cash ready.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

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THE

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PRICES—CASES of THREE DOZEN, 24s. NET.

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Reply to Circular of Mr. CLARKE'S Solicitors, dated 13th June, 1887.

MR. CLARKE'S SOLICITORS OMIT TO STATE THE FACT THAT OUR CLIENTS, MESSRS. JOHN BEEDZLER & CO., OF "THE GOLDEN KEYE," 18, NORTON FOLGATE, LONDON, E.C., ARE TAKING PROCEEDINGS TO HAVE THE WORDS "BLOOD MIXTURE" REMOVED FROM THE REGISTER OF TRADE MARKS. THE CASE IS COMPLETE AND IS IN THE LIST WAITING ITS TURN TO BE HEARD.

Clarke's circular does not draw attention to the fact that in the cases quoted the Defendants *consented* to the injunctions, which were obtained by arrangement and were not granted after argument in open Court.

Neither does the circular state the fact that in December last Clarke applied for an injunction against Mr. Geddes, a Chemist at Oldham, and that an arrangement was come to by which Mr. Geddes *consented* to an injunction, *but only on condition that Clarke paid Geddes' costs of the action.* At Clarke's instance this was afterwards advertised as a victory.

Can Clarke quote a single contested case in which, after argument in open Court, he has obtained an injunction for infringement of the words "Blood Mixture," unless there has been colourable imitation or other fraud?

Messrs. Beedzler, who deprecate anything in the nature of a fraudulent imitation, contend that the words "Blood Mixture" are not a good trade mark, that they are not fanciful, but are entirely and wholly descriptive of the article to which they are applied, and that there is no name which would more appropriately describe a medicine for the purification of the Blood.

Our clients are supported by:—

Professor Redwood	Professor Attfield
Joseph Ince, Esq.	Messrs. Dinneford & Co.
Messrs. Savory & Moore	Messrs. John Bell & Co.
Messrs. Blake, Sandford & Blake	Messrs. Twinberrow & Son

And by upwards of 130 other leading Chemists in London alone, all of whom are of opinion that the words "Blood Mixture" are words in common use, and purely descriptive of a preparation intended to act upon and purify the blood of a person taking it, and are certainly not fanciful words.

We may add that, for upwards of 80 years past, our clients and their predecessors in business have sold medicine under a descriptive title, of which the words "Blood Mixture" form part.

PLUNKETT & LEADER,
60, St. Paul's Churchyard, London, E.C.
Solicitors for Messrs. JOHN BEEDZLER & CO.

June, 1887.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 22nd to September 5th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

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OF THE

Pharmaceutical Society of Great Britain.

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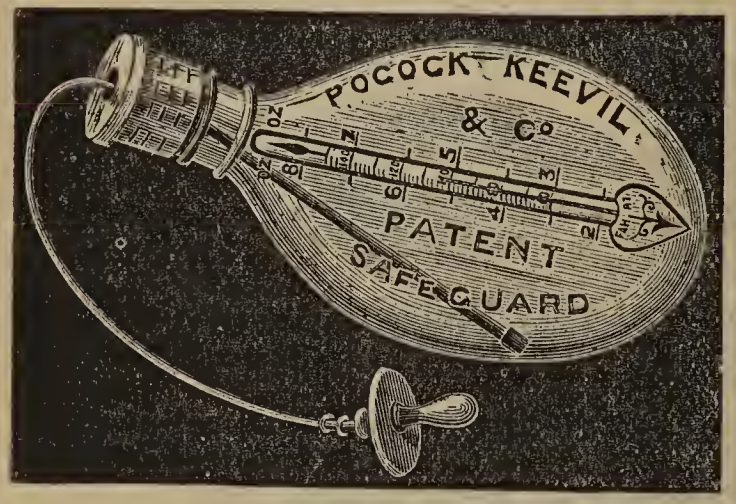

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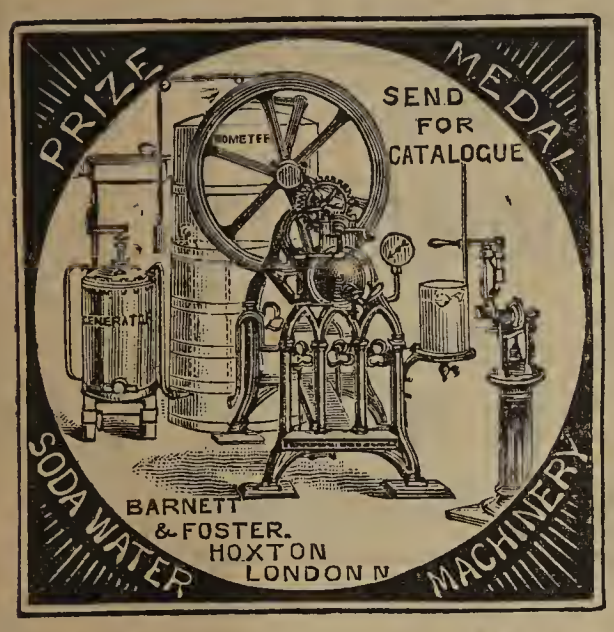

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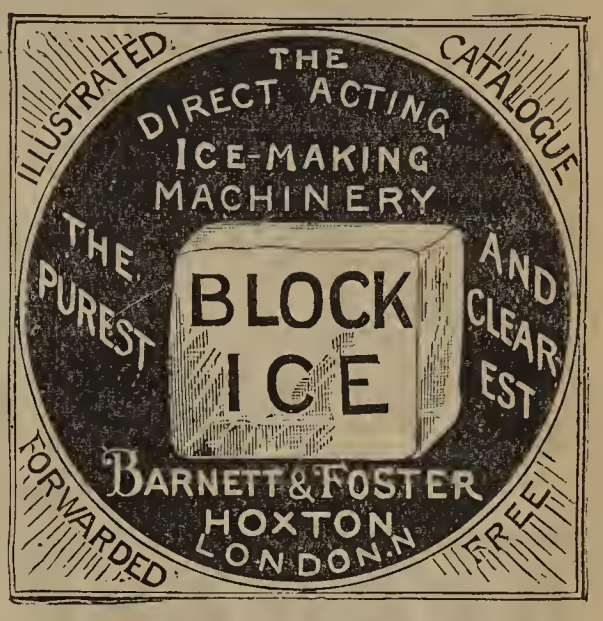

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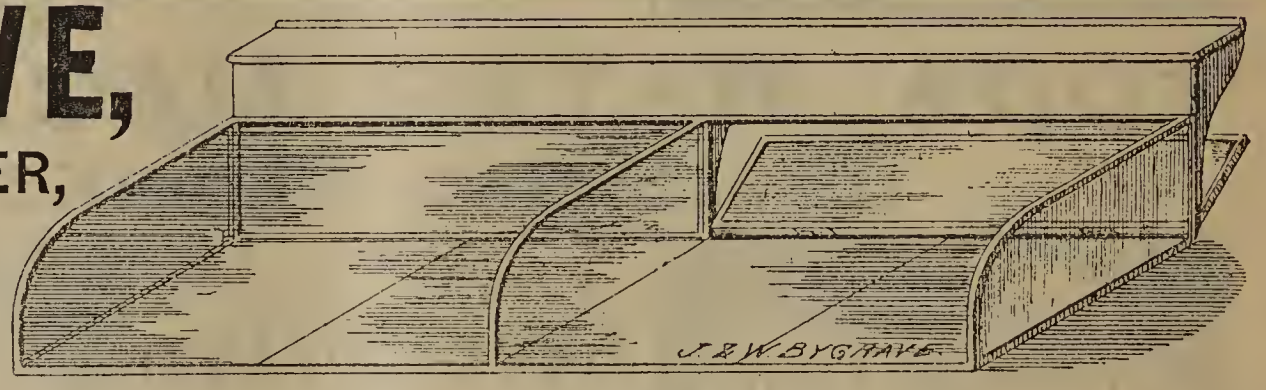

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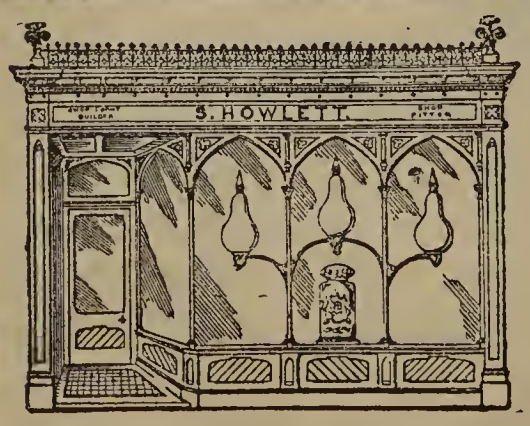

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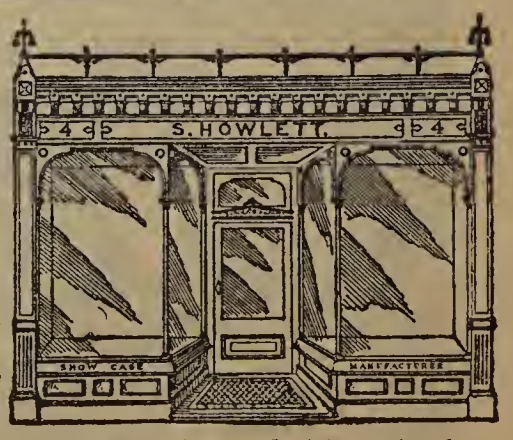

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THE DIGESTIVE FERMENTS.

BY J. SCHWEITZER, M.P.S.

Mr. Benger's paper read before the Manchester Section of the Society of Chemical Industry, published in the *Pharmaceutical Journal* of May 28, and his statement that he could never obtain satisfactory evidence of the digestion of fats by means of the pancreatic secretion, induces me to send you these lines, which perhaps may be of sufficient interest for publication.

In the following notes I will confine myself as much as possible to the action of the pancreatic secretion on fats; since however the functions of our digestive organs are a series of operations, where the one completes what the other has commenced, it will be necessary to say also a few words about the salivary and gastric juice.

As early as 1832 the late Dr. Bright observed, that in cases of disease of the pancreas, fat was passed from the body undigested. These observations were confirmed in other cases by Dr. Elliotson, Mr. Lloyd and others, and hence it was inferred that the secretion of the pancreas performed an important part in the digestion of fats. In 1834 Eberle first discovered that a liquid obtained by digesting the bruised gland in water had the power of converting fats into a kind of emulsion. Although several physiological experimenters had obtained what they regarded as the undiluted pancreatic secretion by operations on living animals, this peculiar action on fats was not again observed until the discovery was made by Bernard in 1846. The operation by which that eminent physiologist procured that which he believed to be the normal secretion of the pancreas need not be described here. It differed somewhat from the means employed by other observers, and the fluid being obtained direct from the duct, it might appear to be better calculated to insure good results. It must be remarked here, however, that all physiologists agree in admitting that the pancreas is peculiarly susceptible to the influence of disturbing causes, and although no one experimenter seems to doubt that the fluid he obtained by vivisection was the normal pancreatic juice, considerable differences are found in the descriptions of the fluid so procured. Tiedeman and Gmelin describe the fluid which first flowed from the duct after an operation, as acid, and state that it afterwards became alkaline. Schultz found the secretion of the dog, cat and horse, acid. Müller describes the secretion as acid. Magendie and Bernard agree in asserting that normal pancreatic juice is alkaline, and Corvisart states that it is generally if not always alkaline. I have found myself in numerous trials on the pancreas of the pig within eight hours after death, that a strip of blue litmus paper, pressed against a freshly cut section of the gland, was almost invariably reddened. In the more extended and systematic series of experiments suggested and devised by Dr. Dobell, of England, which Messrs. Harris, of Calne, kindly enabled me to carry out at their establishment, the glands of forty pigs immediately after death gave the same result. The pigs were prepared for the experiment, some by being killed shortly after a full meal and others at various longer intervals after food, so that the pancreatic secretion might represent that of the gland in full activity, and in perfect repose. In every instance, however, the substance of the gland had an acid reaction, which was not the case with the fat or muscles of the same animals.

As regards other characters of the pancreatic secretion, the descriptions of the different observers do not greatly differ. It is described by Bernard as a viscid opaline fluid, almost entirely coagulable by the application of heat. Frerichs, however, states that only an inconsiderable coagulum forms when this fluid is heated.

The peculiar action of the pancreatic secretion on fats was, as I have said, first discovered by Eberle, but it has been most completely confirmed by the more extended researches of Bernard, who has further demonstrated that it is the only one of the digestive fluids which possesses the power of forming a permanent emulsion with fats. As will be seen, Bernard fell into error in supposing that the fat so emulsified was decomposed or saponified, for which an alkaline secretion would seem to be necessary. No such saponification takes place out of the body, and there are no reasons for supposing that anything like it occurs in the natural process of digestion. The power of converting starch into glucose, which the pancreatic secretion possesses in a far higher degree than the salivary fluid, was first observed by Valentin in 1844, who also found that cane sugar is likewise changed into glucose, the only form, it would seem, in which sugar can be absorbed and used by the animal economy.

The general action of the pancreatic juice on nitrogenous foods and other matters has been fully described by Corvisart, who has shown that it possesses an active digestive power on all aliments similar to, and on some substances surpassing, that of the gastric juice.

The foregoing sketch, I believe, fairly represents the state of our knowledge respecting the action of the pancreatic secretion on fats, up to the period when Dr. Dobell commenced his researches on this subject; and it is to be remarked that, up to that time, no therapeutical application had been made of the facts recorded. By a series of observations, and a process of inductive reasoning, Dr. Dobell arrived at the conclusion that in tubercular diseases there is a defective action of the pancreas on fats, and particularly on solid fats, and was thus led to study the action of the secretion, first with the view to determine its exact character and nature, and, secondly, to find some means of obtaining and preserving the active principle of the pancreas in a form suitable for administration as a remedial agent. The results of these experiments, suggested in the first instance by Dr. Dobell, and in part modified and enlarged by myself, were as follows:—When a solid fat, lard for example, is treated with the crushed pancreas and water, an emulsion is quickly formed, which can be separated from the crushed gland by straining through muslin.

The secretion of the pancreas, however, being peculiarly prone to decomposition, such an emulsion quickly acquires an offensive odour. The experiment of extracting the pancreatized fat with ether was therefore tried, and the remarkable discovery made, that the fat so extracted readily mixes with water and forms a permanent emulsion of uniform strength, which has no tendency to putrefy, and can be preserved for an indefinite time.

The nature of the change produced in the fat by the action of the pancreas has been investigated both microscopically and chemically. Pure lard examined

under the microscope is seen to consist of "aggregations of acicular crystals;" lard which has been submitted to the action of the pancreas exhibits these aggregations of crystals uniformly distributed through a fine granular matter.

In treating with ether the strained emulsion produced by the action of the pancreas on solid fat, and allowing it to rest, it separates into two layers, an ethereal solution, containing the fat, floating on the surface of a watery liquid containing a few particles of pancreatic tissue. The ethereal solution when poured off, and allowed to evaporate, leaves a pure pancreatized fat, which retains the property of emulsifying on addition of water. The watery solution when filtered, contains the soluble extractives of the pancreas. If by the action of the pancreas on the fat the latter were really saponified, or decomposed, and glycerine set free, this would also be present in the water, but on examination no trace of glycerine will be found in the watery portion. But on treating the pure pancreatized fat from the ethereal solution with oxide of lead, and converting it into lead plaster, glycerine will readily be set free. It is thus seen that by the action of the pancreas on fats no chemical decomposition takes place; that the change is simply a molecular one, accompanied by the absorption of a little water. That moisture is absorbed is proved by a slight increase in weight in the fat used, and by the fact that pancreatized fat, when heated for some time to a temperature of 212° F., is reduced in weight and to its original condition, having lost its emulsifying property. While thus completely confirming the results of Eberle and Bernard, Dr. Dobell's investigations have led to the extension of our knowledge of the action of the pancreatic secretion by showing that the change it effects on fats (out of the body at all events) is simply a molecular alteration. That the fat is thereby prepared for absorption by the lacteals there can be no doubt, and it must be accepted that one special function of the pancreas, in the natural process of digestion, is the emulsification of fats as a preliminary step to their absorption.

The preservation of the active principle of the pancreatic secretion for administration as a remedy, apart from the emulsion, has occupied a great deal of my attention. Like pepsine, pancreatine is an albuminous body, soluble in water, insoluble in alcohol and ether; it is highly hygroscopic, speedily undergoes decomposition, and requires great care in its preparation; when once dry it keeps well, and retains the active principles of the pancreas in a high degree. Its power to convert starch into sugar is as great if not greater than that possessed by the salivary glands; it dissolves fibrine and albumen as readily as pepsine, while its property to digest fat is unique. From its triplex digestive power it has also been called tripsine. How great the digestive power of pancreatine is may be seen by a comparison with pepsine.

One grain of pancreatine digests 150 grains of lard, 236 grains of starch and 25 grains of albumen. One grain of pepsine digests no lard, no starch, and 80 grains of albumen.

Both the pepsine and pancreatine were especially and freshly prepared by myself; the pepsine which gave the above results was the best of the specimens found at present in the market—Bullock's of London, Fairchild's, Scheffer's, Jensen's, Boudault's, Velpeau's, etc., included. When it is considered, moreover, that 80 grains of albumen, or hard boiled white of egg, consists of 66 grains of water, and of only 14 grains of dry albumen, while the 150 grains of lard is anhydrous, and the 236 grains of starch contains over four-fifths of dry substance, we may fairly say that the digestive power of pancreatine is more than twenty-four times as great as that of pepsine. In speaking of the digestive power of a sample of pepsine or pancreatine I give the amount of albumen, fat or starch which 1 part of pepsine or pancreatine is able to digest in the first four hours of artificial digestion, and take no notice of what the same mixture may still further effect if modified or altered by addition of acid, dilution, dialysis or removal of the already formed peptones. The digestive power of pepsine or pancreatine is not destroyed or apparently weakened after having once done its full share of digestive work. In experimenting with pepsine and coagulated albumen, where the peptones and the pepsine itself are nearly alike in character, this proof is difficult, as the peptones formed can only be removed from the pepsine by means of dialysis, a slow and imperfect process. But in working with pancreatine and lard the proof is easy and perfect. The emulsified lard, the fat peptone, may readily be separated from the pancreatine itself by ether, chloroform, benzol or any suitable solvent, in which pancreatine is insoluble. I took 1 grain of pancreatine, 150 grains of lard, and 6 drachms of water, and digested this mixture at 100° F., till the lard was completely emulsified, and removed the fat peptone by ether. In the remaining watery portion I added another 150 grains of lard, digested as before, removed the fat when emulsified, and repeated the operation for a third time with another 150 grains of lard, so that 1 grain of pancreatine had digested 450 grains of lard in the course of twelve hours. I have no doubt that I could have repeated the operation still further had time permitted. In the living body, where the peptones can be absorbed as soon as they are formed, the same quantity of gastric or pancreatic secretion can, and does do a large amount of digestive work in a much shorter period of time before it becomes changed and absorbed also.

It has sometimes been stated that the greater acidity of the gastric juice must naturally destroy the more alkaline or less acid ptyalin or pancreatine. It would be strange if our digestive secretions were so constituted and so antagonistic as to be unable to exist side by side with each other without being destroyed. Mr. Brownen, of London, made a series of experiments with human saliva. He found that 1 grain of ptyalin dissolved 716 grains of starch; 1 grain of ptyalin and 2 drops of lactic acid dissolved 870 grains of starch; while 1 grain of ptyalin and 2 grains of bicarbonate of soda dissolved only 510 grains of starch, showing that the activity of ptyalin was greatest in an acid solution, and that it was considerably reduced when slightly alkaline.

I worked nearly daily for many years with the pigs' pancreas. I found the pancreatic secretion, with very rare exceptions, acid. Occasionally, it is true, it was neutral, and sometimes even alkaline; but the emulsion of fat itself, the fat peptone, even if prepared from the alkaline sweetbreads, had invariably an acid reaction, just as Mr. Brownen found that the starch solution, produced by the alkaline ptyalin, had also an acid reaction. That the gastric juice is acid requires no mention. It is thus seen that all

our digestive secretions act in an acid condition, and that the products of their action, the peptones, are acid fluids also. The degree of acidity in which each possesses the highest activity varies: pepsine acts best in a tolerably acid solution, and loses its activity when alkaline; ptyalin and pancreatine act best when slightly acid, but do not lose their activity when alkaline. The acid state of the pancreatic emulsion is of practical importance, and is a reliable proof of its genuine pancreatic nature, as it would be easy to emulsify fat in an alkaline fluid, even without a trace of pancreas or pancreatine. To prove further that pepsine does not destroy pancreatine, and that pancreatine does not destroy pepsine, the following experiments were made:—

(1) I took 1 grain of pancreatine, 1 grain of pepsine, 1 ounce of water, and digested this mixture at a temperature of 100° F. with 150 grains of lard and 80 grains of hard boiled white of egg; in less than four hours the albumen was dissolved and the lard emulsified.

(2) I took 1 grain of pancreatine, 1 grain of pepsine and 1 ounce of water, and digested this mixture by itself for four hours at 100° F. To this digested mixture I added afterwards 150 grains of lard and 80 grains of albumen and digested again; it dissolved the albumen and emulsified the lard also, forming a beautiful thick cream-like emulsion, but it took a little longer to do this than experiment No. 1; it took in fact five hours.

(3) I took 1 grain of pepsine and 1 ounce of water, digested this for four hours, and added 80 grains of albumen and digested again. It dissolved the albumen in the same way as No. 2.

(4) I took 1 grain of pancreatine, 1 ounce of water, digested for four hours, and added 150 grains of lard and digested again. It emulsified the lard in the same way as No. 2.

(5) I took 1 grain of pepsine, 1 ounce of water, 8 minims of hydrochloric acid, digested for four hours and added 80 grains of albumen and digested again. The albumen dissolved, but it took seven hours, or much longer than experiment No. 3.

(6) I took 1 grain of pancreatine, 1 ounce of water, 8 minims of hydrochloric acid, digested for four hours, and neutralized the acidity by means of carbonate of soda, and added 50 grains of lard and digested again. The lard did not emulsify, the pancreatine had in fact lost its activity.

(7) I took 1 grain of pepsine, 1 ounce of water, 5 grains of bicarbonate of soda, digested for four hours, after this digestion I neutralized the soda by means of hydrochloric acid, and added 8 minims more acid and 30 grains of albumen, and digested again. The albumen did not dissolve, the pepsine had in fact lost its activity also.

It becomes evident therefore that—

(*a*) Pancreatine and pepsine (or the pig's stomach and pancreas) act with perfect ease and freedom in presence of each other.

(*b*) When digested together they do not destroy each other, nor do they lessen each other's digestive activity in whatever proportion they may be digested.

(*c*) Long continued exposure to heat and moisture injures their original activity.

(*d*) Digested in alkaline or acid solutions the injury is increased.

(*e*) Pancreatine when digested for some hours in an acid solution becomes permanently injured or destroyed, and

(*f*) Pepsine when digested in an alkaline solution for some hours is also permanently destroyed.

That long continued digestion in water should affect organic bodies like pepsine or pancreatine is not surprising, and that the injury should be increased by an addition of acid or alkali is also but natural; yet a state of acidity, such as the healthy natural secretion of the salivary glands of the stomach or of the pancreas presents, is not sufficient to interfere with any of their digestive functions.

Kansas City, Missouri, U.S.A.

THE BOTANICAL SOURCE OF HAMAMA.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

In the appendix A. of Dymock's 'Materia Medica of Western India,' which includes a list of undetermined drugs, the above name occurs, with the following information.

"*Hamama, Amamoon, or Amooman.*—The drug sold under this name in Bombay exactly corresponds with the figure of amomum in the 'Exotica' of Clusius, and appears to be a moss. It occurs in tufted masses, the size of a man's fist, or larger, and reminds one of the *Sphagnum* seen in the turf bogs in Europe. Persian writers speak of several kinds of the drug; one of these is said to grow in water. Hamama does not in the least agree with Dioscorides' description of amomum."

For some years this drug remained unidentified both in the Museum of Kew, and in that of the Pharmaceutical Society. A few weeks ago, however my attention was directed to it by Professor Baillon, who, on a recent visit to London, brought a very similar drug which he identified with the "amomum arabum" of Breynius ('*Ephemeridæ Germanicæ*,' ccxci., p. 512, A.D. 1672).

This led me to refer to Breynius' figure, when I found that the Bombay drug presented to the Museum of the Society by Dr. Dymock much more closely resembled the drawing of Breynius, which is copied from Clusius.

Professor Baillon had compared his specimen, at the Kew Herbarium, with species of *Dionysia* and *Gypsophila*, but without apparently arriving at a satisfactory determination.

Following up the clue thus afforded, I found in the Herbarium of the British Museum, a specimen of *Dionysia diapensiæfolia*, Boiss., exactly corresponding with the Bombay drug, and which bore, in the handwriting of Kotschy, the following inscription:—

"Ad parietas rupium in septentrionem spectantes pr. ruinas, Persepolis. D. 15 Aprilis 1842. '*Tscha mama*' Pers."

The similarity of the Persian name to that under which the drug is known in Bombay, and the agreement of the two plants as regards leaf and habit, leave no doubt in my mind as to their identity. The species forms No. 236 of Kotschy Exsicc. in 'Pl. Persep. Austr.,' issued in February, 1845. It has been described by Boissier in the 'Flor. Orient.,' vol. iv., p. 20 (1879), and in 'Boiss. Diag.,' ser. 17 p. 65.

From the latter the following description is taken:—

"Densissime et late cæspitosa, ramis ob folia vetusta dense imbricata columnaribus; foliis minute hirto-glandulosis, planis, subflabellatim reticulato-venosis, ovatis et oblongo-spathulatis, basi attenuatis obtusissimis, integris vel obtuse utrinque 1–2 crenatis; pedunculis subnullis, rosulæ foliis occultatis vel paulo longioribus, breviter exsertis, 1 rarius 2–3 floris, floribus involucro 3–5 bracteato suffultis; bracteis lineari-spathulatis, obtusis, integris, calycem æquantibus; calycis ad ¾ partiti, laciniis lineari-spathulatis obtusis, corollæ luteæ glanduloso-hirtæ, tubo calyce quadruplo longiore, limbi ampli laciniis ovatis retusis. Cæspites lati, 3–4 pollices elati, folia 1½–2 lineas longa, calyx 2½ lineas, corolla 10–12 longa. Pedunculis exsertis et involucro affinis D. cæspitosæ sed in hac pedunculus longus, bracteæ majores incisæ, calycis laciniæ acutæ, corollæ limbus minor."

The genus *Dionysia* belongs to the natural order *Primulaceæ*, and is nearly allied to *Androsace*, the species of which are probably familiar to most botanists who have visited the European Alps. From the latter genus it differs chiefly in the long curved corolla, and in the aromatic properties of the leaves. The aromatic constituent probably resides in the glandular hairs with which the plants are more or less covered. Although the drug when chewed does not at first appear to possess much flavour, yet when made into a decoction or infusion it gives off a very perceptible and rather agreeable odour. It is probably to this aroma that its use as an alexipharmic and aromatic are due.

Hamama possesses some degree of interest on account of probably being the "amomis" or "false amomum" of old writers on materia medica. Dioscorides ('Mat. Med.,' lib. i, p. 29, Ed. Sprengel, 1829–30) says that the amomis which was used to adulterate the true amomum* grew in Armenia, and was destitute of fruit, but had flowers resembling origanum.

Pliny (lib. xii., cap. xiii., p. 365; Holland's transl., 1601) states concerning amomis that it was less full of veins and not so sweet smelling as the true amomum.

The amomis known in Europe and in Persia and in the Turkish Empire in the 14th and 15th centuries is figured by Clusius ('Exoticarum,' lib. i., p. 199) A.D. 1601, as a somewhat smaller plant than hamama, with more acute leaves, and stems bare and somewhat divergent at the base,† but similar in habit to that plant.

Clusius states concerning it that both it (amomis) and another similar drug which he figures under the name of *Amomum spurium*, had been recently received from Ormuz, on the Persian Gulf, under the name of amomum and amomis, by Walerandus Donrœus, an apothecary of Lyons, and that in the year 1582 a similar drug had been received at Vienna from Constantinople, under the name of amomum.

Prosper Alpinus, who visited Egypt in 1580–1583, describes ('De Med. Ægypt.,' lib. v., cap. x., p. 301) the drug used in that country under the name of hamama, in terms which may well apply to the Bombay drug, and to the amomum and amomis figured by Clusius, but not to the true or fruit-bearing amomum. Clusius supplies further evidence that hamama and his *Amomum spurium* are identical, in the fact that he had made inquiries of a Spanish Jew who had resided in Jerusalem, and had been informed by him that amomum was identical with hamama, which signified in Arabic "dove's foot."

The evidence above given seems to show that the *Amomum spurium* of Clusius, hamama, and the amomis both of ancient writers and of European authors of works of materia medica, were derived from the region between Armenia and Persia; that they were leafy and woody drugs without fruit, and were slightly aromatic. Further, that the Persian name "tscha mama" is still applied to a plant which agrees well with the figure given of *Amomum spurium* by Clusius. As Persian writers speak of different kinds of the drug it seems quite probable that the term amomis might be applied to one of these as distinctive. As a matter of fact the figure of the amomis given by Clusius bears a strong resemblance in the more acute leaves and bare, forked stems to *Dionysia rhaptodes*, Bunge, in which the leaves, owing to their revolute edges, appear to be narrow and acute. The bare stems are also in size and scaly character suggestive of the name of dove's foot, applied to the drug by the Persians.

In conclusion, there can be little doubt, as remarked by Dr. Dymock, that the hamama of the Bombay market agrees exactly with the figure given by Clusius under the name of *Amomum spurium*. This plant I identify with *Dionysia diapensiæfolia*, Boiss, the tscha mama of the neighbourhood of Persepolis. The other plant represented under the name of amomis, by Clusius, I venture to suggest, not having seen a specimen of it, is probably *Dionysia rhaptodes*, Bunge.

Whether both these plants were included under the name of amomis by Dioscorides and Pliny is almost impossible to determine, owing to the meagreness of the description they give of the drug, but there seems every probability that such was the case.

* Supposed to be the cluster cardamom, *Amomum Cardamomum*, L., and possibly including also other cardamoms.

† This figure of amomis is copied in Gerarde's 'Herball,' Johnson's Ed., 1633, p. 1549.

EXAMINATION OF WOOL FAT.*

BY FRIEDRICH KLEINSCHMIDT.

The chemical composition of wool fat is a complex one. In a crude impure condition its constituents are cholesterin with isocholesterin in combination with free fatty acids like stearic acid $C_{18}H_{36}O_2$ and traces of others. The odour of wool fat is due to volatile acids, chiefly capric and caproic $C_6H_{12}O_2$, which are always found in sweaty secretions. There has also been found ceryl cerotate† and its homologues, and probably cholesteryl cerotate. Wool fat contains further a certain proportion of glycerides of the lower fatty acids.

Pure wool fat, when used for medicinal purposes, should not contain these fatty acids in a free condition. The cholesterin is combined with fatty acids, like the cholesterin ethers of the stearic acid series $C_nH_{2n}O_2$, and of some of the oleic acid series $C_nH_{2n-2}O_2$. Wool fat therefore cannot be called a fat as it is not a glyceride. It does not form soaps with caustic alkalies, except in a melting condition of such alkalies, but it has the property to form emulsions with alkaline solutions.

Physical Properties.—Pure wool fat is of a yellow or light brown colour, it is of a rather tough consistence and should have in a slight degree the characteristic odour of wool. Its specific gravity is 0·973, and its melting point between 38 and 40° C. The specific gravity of Jaffé and

* From the *Pharmaceutische Rundschau*, July.

† Allen's 'Analysis,' ii., 317.

Darmstädter's lanolin is somewhat less, mostly 0·86, or even lower, due to the centrifugation of the fat with water. Wool fat, different from any other oil or fat, mixes readily with water, and as much as 250 per cent. or even more can be incorporated, adding small proportions at a time. Wool fat is soluble in the ordinary fat solvents. Below I give a careful analysis of the three wool fats now in our market: Agnine, manufactured by Th. Metcalf and Co., of Boston; lanolinum puriss., Liebreich, and lanolin Liebreich C. P., both manufactured by Benno Jaffé and Darmstädter, of Berlin, Germany.

In the following report they are designated respectively by number I., II., III.

	Agnine.	Lanolin. puriss.	Lanolin.
Specific gravity . . .	0·94	0·85	0·86
Water	none	19·26 p.c.	23·74 p.c.
Free fatty acids in terms of stearic	22·12 p.c.	7·752 „	1·254 „
Mineral matter . . .	0·08 „	0·17 „	traces
Solid alcohols plus water of hydration	73·46 „	41·9 „	53·7 „
Volatile fatty acids as capric and caproic $C_6H_{12}O_2$	0·44 „	1·6 „	1 48 „
Non-volatile insoluble fatty acids	27·6 „	36·12 „	23·7 „

The sum of these percentages goes much above 100, owing to the hydrolysis of the solid alcohols met with in saponification.

The above are the average results of several analyses which I have made at the laboratory of Dr. Bennet F. Davenport, State Analyst for Massachusetts, and the special estimations were as follows:—

Free Fatty Acids.—5·0 grams of the sample melted with neutral benzine, and another time with neutral strong alcohol, and heated to boiling on a sand-bath. After the addition of phenolphthalein as indicator, these solutions were titrated with $\frac{N}{5}$ NaHO, added in small proportions and gently warmed after each addition. Three samples of each gave the following average results:—

Agnine required . . . . . 19·4 c.c. $\frac{N}{5}$ NaHO
Lanolinum pur. required . . . 6·8 c.c. $\frac{N}{5}$ NaHO
Lanolin Liebreich required . . 1·1 c.c. $\frac{N}{5}$ NaHO

One c.c. $\frac{N}{5}$ NaHO being equal to 0·057 gram fatty acid taken as $C_{18}H_{36}O_2$.

Agnine = 19·4 × 0·057 = 1·1058 grams free acid in 5 0 fat, or 22·12 per cent.

Lanolinum pur. = 6·8 × 0 057 = 0·3876 gram free acid in 5·0 fat, or 7·752 per cent.

Lanolin Liebreich = 1·1 × 0·057 = 0·6227 gram free acid in 5·0 fat, or 1·254 per cent.

Volatile Fatty Acids.—To determine these Reichert's distillation process, described in *Zeitschrift für Analytische Chemie*, xviii, 68, was used. Five grams of each sample was saponified with 10 c.c. alcohol containing 2 grams of KHO evaporated and diluted with H_2O to 100 c.c. Then 50 c.c. of a 10 per cent. volume H_2SO_4 solution was added and 100 c.c. distilled over; 50 c.c. H_2O were added several times and distilled over. All volatile acids are there received with the distillate. The cholesterin and insoluble fatty acids, contained in the residue in the flask, were separated by a wet filter and reserved for further use. The distillates were then titrated with $\frac{N}{10}$ NaHO in the usual way, giving the follow- results:—

Agnine required 6·6 c.c. $\frac{N}{10}$ NaHO; Blank test subtracted = 2·6.

Lanolinum pur. required 9·2 c.c. $\frac{N}{10}$ NaHO; Blank test subtracted = 5·2.

Lanolin Liebreich required 8·2 c.c. $\frac{N}{10}$ NaHO; Blank test subtracted = 4·2.

This operation was repeated in order to get the blank test; the fat was left out, and the acid distillate obtained required 4 c.c. $\frac{N}{10}$ NaHO to neutralize; this evaporated and dried, weighed 0 04 gram.

The volatile acid soaps were then evaporated and further dried at 100° C. until the weight remained constant.

Agnine = 0·068 gram; lanolin. puriss. = 0·132 gram; lanolin Liebreich = 0·123 gram.

Blank subtracted gives the actual weight of volatile acid soaps in 5·0 gram of the sample.

Agnine = 0·028; lanolin. puriss. = 0·092; lanolin Liebreich = 0·083.

Agnine required 2·6 $\frac{N}{10}$ NaHO multiplied by the amount of the HO displaced by saponification Na in 1 c.c. $\frac{N}{10}$ NaHO = 0·0023. This will give the amount of Na in volatile acid soap = 0·006 gram. This subtracted from soap of volatile acid leaves amount of volatile acid in 5·0 grams of the sample or 0·44 per cent.

Lanolinum Puriss.—5·2 c.c. = $\frac{N}{10}$ NaHO used.

5·2 × 0·0023 = 0·012 gram = amount of Na
0·092 amount of soap
minus 0·012 amount Na

0·080 = amount of volatile acid or 1·6 per cent. volatile acid.

Lanolin Liebreich.—4·2 c.c. = $\frac{N}{10}$ NaHO used.

4·2 × 0·0023 = 0·00926 = amount of Na
0·083 amount of soap
minus 0·009 amount Na

0·074 = amount of volatile acid or 1·48 per cent. volatile acid.

Cholesterin and Isocholesterin (Ether Residue).—5·0 grams of each sample were saponified with 10 c.c. of alcohol containing 2 grams of KHO, and diluted with water and evaporated. When most of the water was driven off, some sand and $NaHCO_3$ crystals were added, to neutralize any excess of alkali. This was further evaporated over a low gas flame, and then dried at 100° C. When dry it was powdered, packed into a cylindrical percolator and exhausted with ether. The ethereal solution was evaporated to dryness, and further dried at 100° C., until the weights were constant. The solid alcohols plus water of hydration were then:—

Agnine . . . 3·673 grams or 73·46 per cent.
Lanolin. puriss. 2·095 „ 41·9 „
Lanolin Liebreich 2·655 „ 53·7 „

Insoluble Fatty Acids.—As stated before, the residue in the volatile acid determination was separated by pouring on a wet filter. These were further dried at 100° C., and gave the following constant weights:—

Agnine . . . 5·053 gms. = 101·6 per cent.
Lanolinum puriss. 3·9 „ = 78·02 „
Lanolin Liebreich 3·84 „ = 76·8 „

These per cent. weights are combined solid alcohols and insoluble fatty acids, and the solid alcohols subtracted will leave the insoluble fatty acids.

	Agnine.	Lanolinum puriss.	Lanolin Liebreich
Combined, per cent. .	101·06	73·02	76·8
Solid alcohols, per cent.	83·46	41·90	53·1
Insoluble acid per cent.	27·06	36·12	23·7

GASTEIN AS A HEALTH RESORT.*

In the day when William von Humboldt visited Gastein, as in our own, the waterfall has been a subject of concern, as well as an object to be admired. Then the nervous patients who came to Gastein for cure could not sit in comfort or sleep at all within sound of the

* Extract from a series of articles on "Austrian Health Resorts" in the *Times*.

rushing water. Then it was impossible to converse in comfort in a room near the fall. This is equally true still. Humboldt notes that he did not dislike the noise, though he found it disagreeable to strain his voice in conversation. In our day nervous patients suffer as they did in his, and the waterfall is regarded by many visitors with repulsion and horror. Humboldt mentions that such persons take long walks in order to get away from the noise. It is not uncommon now for those who are sensitive to sounds to live lower down in the valley. As for Humboldt, he was never weary of gazing upon the waterfall, and he was never disturbed by its din. He notes that he took a bath at four o'clock in the morning, stayed an hour in the water, and went back to bed, where he slept for two hours. It was remarked as something extraordinary that the Empress of Austria when she was here should take a bath so early as four o'clock, as the hour for opening the baths is five, and most persons bathe between six and seven. In one respect the cure was pursued half a century ago in the same fashion as at present. When Humboldt was at Gastein few persons drank the waters ; few drink them now. Some doctors prescribe them, and Dr. Pröll considers their internal use to be quite as curative as their external application. He remarks with perfect justice that for centuries after the waters of Carlsbad were known to effect cures no one thought of drinking them, whereas now there is far more drinking than bathing, while the results from their internal use are even more striking than those from baths alone. In like manner the Gastein waters may yet enjoy a renown hereafter greater than they have now should the fashion of drinking them become general. Though Gastein has grown since Humboldt's visits, a complaint which visitors made in his day is made still ; it is that the walks on level ground are very few and short. Many patients being weak and elderly, the necessity of ascending a hill with the view of taking a long walk is a serious drawback to enjoyment, and may even retard the cure in several cases. Humboldt paid his first visit in 1827, and his last in 1830. In a letter written in 1830 he states that the baths improved his appetite, and he laments that the food is bad. Being so hungry, however, he was able to eat food from which he would turn with repulsion elsewhere. Some visitors still grumble about the food. For my own part I had no reason to complain. When one considers the distance from which everything has to be brought, and the difficulties of transport, one is inclined to wonder that the living is so good. That in these circumstances prices should be high is a matter of course.

Life at Gastein is very earnest. People visit it to be cured and not for pleasure. Beyond a band playing twice a day, nothing in the shape of amusement is provided. Patients go to bed and get up early ; they eat little during the day and they remain as much out of doors as possible. Above all things they must regularly consult a physician and strictly follow his advice. To take a bath without first seeing a doctor is held to be tempting Providence and incurring the risk of sudden death. As Dr. Pröll puts it, such conduct is as foolish as that of the person who should go to a chemist's shop, procure a dose of strong medicine, swallow it, and then have recourse to a doctor for advice. The most remarkable thing connected with the waters of Gastein is that, while powerful in their action, they are very poor in mineral ingredients. Chemists style them "indifferent" waters ; the word is misleading if taken in its ordinary signification, but what is meant is that they have little chemical importance. Such waters, of which many exist, are classed as "akratothermin," the word being compounded of ἄκρατος, unmixed, and θέρμη, warm bath. Mistakes have arisen from confounding ἄκρατος with ἀκρατής, weak, and concluding that such baths were powerless. It is easier, however, to settle the meaning of words than to explain why the waters which contain so little mineral substance should prove curative. The chief ingredient is silicic acid, but what the effects of that acid are on the skin or the inner organs is a mystery. Of late years it is the fashion to solve problems by the aid of electricity. In default of any other explanation of its action, Gastein water is said to exercise a powerful action upon the human system because there is so much electricity in it. The conductivity of the water as compared with distilled water is said to be as six to one. Both Dr. Pröll and Dr. Bunzel insist upon the electrical character of the water, though the former confesses that he is sceptical as to the electric shocks which some patients report to have occurred while bathing, and he attributes this to excessive sensitiveness, coupled with a vivid imagination on their parts. But Dr. von Härdtl and others entirely differ from their colleagues, maintaining that the talk about electricity is purely empty, and stating that according to experiments made at Munich with Gastein and Isar water, they both displayed the same electrical conductivity without resembling each other in their healing power. So long as medical authorities of equal note display that happy divergence of view which leads to so many experiments and so much discussion, the public must take the side which pleases it the best, and at present the action of Gastein water is generally supposed to have some connection with electricity.

That the water of Gastein is hot when it issues from the earth is the one fact which cannot be denied. A hot water bath has a certain specific action, whether the water be plain or mineralized. If hot baths at Gastein act better or differently when mineral water is employed than hot baths would when plain water is the sole agent, then mineral water has a marked superiority over plain water. It is one thing, however, to note that mineral water acts in a particular way, and it is something quite different and far more difficult to explain the cause or the manner of its action. Professor Seegen, after thirty years' practice at Carlsbad, found that the Carlsbad waters produced an alleviation of the worst symptoms in cases of diabetes, such as could not be induced by any other water or medicine ; he candidly admitted, however, his inability to explain how the result was obtained. Writers about mineral waters would do well to display a modesty such as his, which was that of a man of great talent and varied scientific attainments. That Gastein mineral water is curative may be accepted as a fact ; but the reasons are as obscure now as they were when the legendary stag resorted to it for relief in the year 680.

I have drunk the Gastein water and found it no different in taste from ordinary warm water. I have taken several baths without any appreciable result. Others have been less fortunate. I have collected particulars concerning many persons who have suffered for drinking and bathing in the water without medical advice. Dr. Pröll narrates how a man came to Gastein in July, 1860, suffering from an affection of the spine ; how he took a bath shortly after his arrival, and felt so much the worse that he started off the following day under the impression that the mineral waters were injurious. He cites the case of a lady who climbed a hill after her first bath, felt faint, fell, and broke her arm : but he omits to say that climbing a hill after a hot bath is a mistake, whether the water be mineralized or not. The strongest case advanced by Dr. Pröll is that drawn from his personal experience. He took too many baths and he felt the worse for them. He fails to see that no stronger reason need be assigned in support of his contention that every patient should consult a doctor before bathing. As a patient he required advice as much as, if not more than, any layman. So long as a physician cannot heal himself so long must the word "impossible" remain in the dictionaries, despite the First Napoleon's objection to it. Two things seem to demonstrate the potency of Gastein mineral water, and one of them shows that the mountain air of the locality cannot alone effect the cures which are wrought. First, the patients in the public hospital

are for the most part mountaineers ; they are born and bred in the neighbourhood ; they are ailing when they begin the treatment, and they are cured by bathing in and drinking the water. Second, withered flowers placed in the water revive and regain their lost perfume. I tried the experiment and it succeeded perfectly. I divided the flowers into two bunches, placing one in a tumblerful of ordinary water and the other in Gastein mineral water. After the lapse of a few hours the wild flowers, which had been plucked the day before and were to all appearance quite dead, revived and remained fresh for several days, while those in the plain water remained withered and scentless. It is said that Gastein is emphatically a bath for old men, a place in which they renew their youth. If the water acts upon them as it does upon the flowers they ought not only to become young again but remain evergreens. The flowers are affected in the course of a few hours, but some patients are less sensitive to the action of the water. Dr. Pröll mentions a patient who felt no good result till eleven months after he had quitted Gastein. This would imply that in certain cases the "cure" lasts one month, and that the rest of the year must pass away before the patient gets well enough to be ready to resume the "cure" Such a "cure" may eventually be radical, but it cannot be called rapid.

For those who are not debilitated or incapacitated from walking at all there are many pleasant excursions to be made in the neighbourhood of Gastein. An hour's walk up the valley brings one to Böckstein, which is more charmingly situated than Gastein, but where there are no mineral springs. On the other hand, the drinking water at Böckstein is delicious, being very cold and very pure. A hydropathic establishment attracts many persons to Böckstein. Still farther up the valley the scenery is most striking. In other valleys, not far distant, as fine views can be had, while there are several lakes most picturesquely situated. Among them the Pochart is the largest and the most curious lake. Its water is impregnated with arsenic ; no living thing exists in or near it ; the colour of the water is a deep black ; in fact, the lake is a dead sea.

GUMMOPHOSPHATE OF LIME.*

BY DR. SAMBUC.

Phosphate of lime has hitherto been rendered soluble for therapeutic purposes by the aid of hydrochloric, lactic, citric, or some other acid, a method which has the inconvenience of introducing into the product, besides the useful calcic phosphate, a salt of lime that is useless or even hurtful. It is an error to suppose that the preparations vaunted under the names "chlorhydrophosphate," "lactophosphate," or "citrophosphate" of lime are double salts in which the phosphate employed preserves its primitive condition in the presence of the acid. The phosphate is destroyed, whether it be dicalcic or tricalcic, and gives place to an acid monocalcic phosphate, with which is formed an accessory salt of lime, calcic chloride, lactate or citrate.

It follows from this that the medical man who prescribes chlorhydrophosphate, for example, so as to give one gram of monocalcic phosphate, causes to be ingested at the same time 1·12 of calcium chloride, a dose that would never be tolerated in a potable water. If he wished to go as far as 5 grams of phosphate per day, he would cause his patient to take nearly 6 grams of calcium chloride daily, the action of which upon the system might be dangerous, so that common prudence compels him to confine himself within limits that are frequently insufficient.

This is the danger that the author has sought to avoid in utilizing the work of M. Fremy upon the chemical constitution of gums, and the more recent observations of Messrs. Lefort and Thibaut upon their solvent power.†

It is known that gum arabic is a combination of gummic acid with lime, potash and magnesia. On the average, 100 grams of gum contain 0·97 gram of lime, 0·63 gram of potash and 0·27 gram of magnesia, which is equal to saying that the gummic acid of 100 grams of gum can dissolve 1·75 grams of calcic oxide (the sum of the three bases), and consequently can render soluble 10 grams of dicalcic phosphate ; for these 10 grams contain 3·5 grams of calcic oxide, of which one-half passes then to the state of gummate of lime (regenerated gum), whilst the other half remains in the state of soluble monocalcic phosphate. But as Messrs. Lefort and Thibaut have also recognized the solvent action of gum upon insoluble metallic oxides, and as, following them, the author has verified that 100 grams of natural gum arabic dissolves 1·10 gram of bibasic calcic phosphate, which is due no doubt to the presence of free gummic acid, it is permissible to reckon upon a solvent power superior to that calculated at first on the amount of alkaline bases and alkaline earths alone.

In order to obtain the maximum effect it is necessary therefore to isolate the gummic acid from its natural combinations, free it from the three bases, by separating them as soluble salts, and replacing them by an equivalent proportion of dicalcic phosphate. The method adopted by the author is as follows. Melt 300 grams of gum picked and washed, in 600 grams of water, using for the purpose a narrow deep vessel and suspending the gum, just beneath the surface of the water by means of a bag or diaphragm, to facilitate solution. Then add to the liquid 24 grams of hydrochloric acid, sp. gr. 1·18. The solution decanted, or if necessary, passed through a fine strainer, is introduced into a dialyser of such dimensions that the layer of liquid is not more than 15 millimetres thick. The outside liquid should be rain water or water free from earthy salts. It should be renewed either by a continuous regulated current, or by being changed at intervals, the first twice at intervals of six hours, the third time after an interval of twelve hours. At the end of two days the dialysis is finished, the chlorides of calcium, potassium and magnesium formed by the action of the hydrochloric acid upon the gummate of the three bases being eliminated by exosmose, as well as the slight excess of hydrochloric acid. In the dialyser there remains only a solution of gummic acid, the purity of which can be verified by means of silver nitrate if rain or distilled water has been used.

On the other hand dicalcic phosphate is prepared by mixing two solutions, one containing 66 grams of non-effloresced phosphate of soda and the other 40·5 grams of crystallized calcic chloride, or in default of that 21 grams of the very dry fused salt. The precipitate, at first gelatinous, gradually assumes a crystalline form. The supernatant liquid is decanted off, and the precipitate, still moist, is mixed with the dialysed solution of gummic acid, which dissolves it entirely if the gum used has been of good quality and the operation well conducted. The quantity of dicalcic phosphate produced is 32 grams and supposing that the finished product measures one and a half litres this would represent a little over a 2 per cent. solution.

The product thus obtained presents, in the author's opinion the following advantages over similar preparations in use :—

(1) It has only a feeble and easily tolerated acidity, which can be rendered agreeable in the same way as acidulated lemonades by adding sugar at the time of administration.

(2) It contains none of the saline compounds—calcic chloride, citrate or lactate—which have already been referred to as causing inconveniences.

(3) Further, in the place of these salts, useless at least, if not dangerous, a useful compound, gummate of lime,—that is to say, regenerated gum,—is substituted, possessing, like natural gum, properties that are beneficent in the affections for which calcic phosphate is suitable.

* *Journal de Pharmacie et de Chimie*, [5], vol. xv., p. 412.

† *Pharmaceutical Journal*, [3], vol. xiii., p. 301.

Of the inconveniences presented by this preparation, the most serious is the difficulty of preserving the solution, which undergoes alteration in less than a month, and more quickly if sugar be added to it. It can, it is true, be kept during several months by adding a little salicylate of soda (1 per 1000): but it is better to prepare it according as it is wanted. There are a large number of very useful medicaments in the same case, which no one thinks of prescribing for that reason.

It is necessary, also, to use the greatest care in the choice of the materials employed. The gum ought to be of very good quality, Senegal gum being the kind that has given to the author the best results. The phosphate of soda and chloride of calcium should be in a good state of preservation, for the effervescence of the former, or the deliquescence of the latter, might lead to considerable error in the proportions reacting. It could be conceived, for instance, that an effloresced phosphate of soda might contain much more phosphoric acid than one recently crystallized, with its twenty-four equivalents of water. The results of some experiments made by the author upon this point are given in the following table:—

22·495 grams of phosphate of soda recently crystallized and well drained lost—

In 1 day.	1·425 grams of water, or	6·3	per cent.
In 2 days	2·225 „	9·8	„
In 4 days	3·225 „	14·3	„
In 7 days	5·105 „	22·7	„
In 10 days	6·180 „	27·5	„
In 22 days	6·735 „	30 0	„
In 83 days	10·580 „	47·0	„

These results, obtained by free exposure to the air of an unheated room in November, December and January, show that disodic phosphate may lose in three months one-half of its weight of water of crystallization; so that using 66 grams of a salt in this condition would be equal to introducing 130 grams into a preparation in which there was not an equivalent quantity of calcic chloride employed. As this efflorescence goes on continuously, and without analysis it is not possible to determine how far it has gone when the salt is required for use, it is best to avoid the uncertainty by crystallizing the salt when required, or keeping it in a stoppered bottle at the bottom of which is a layer of water separated by a diaphragm or some broken glass, or by substituting for it phosphate of ammonia.

Similarly chloride of calcium, by absorbing water, may lead to error in an opposite direction, but this is more easy to deal with by drying the salt before using it.

The author also confirms the statement of Buignet as to the solubility of phosphate of lime in water charged with carbonic acid. He found by experiment that a siphon of Seltzer water, charged under a pressure of six atmospheres, is capable of dissolving 1·7 gram of freshly precipitated dicalcic phosphate, and although this proportion is not very high, he thinks the mode of administration might be utilized more often than it is.

USTILAGINE.*

BY C. J. RADEMAKER, M.D., AND J. L. FISCHER, PH.G.

Preparation.—Exhaust *Ustilago maydis* with diluted alcohol. Allow the alcohol to evaporate spontaneously, and to the residue add a little sulphuric acid. The mixture was placed in an osmometer and submitted to dialysis; in twelve days the dialysed portion was filtered and evaporated to dryness at a low temperature. The residue was washed with absolute alcohol, and then dissolved in distilled water. This aqueous solution was treated with caustic potash in excess, and then agitated with ether; the ether separated, and allowed to evaporate spontaneously. This left a crystalline residue that was soluble in water, and had an alkaline reaction. This alkaloid we shall name *ustilagine*; its salts are crystallizable, the acetate crystallizing in long slender needles.

* From the *National Druggist*, June 17.

Properties.—This alkaloid is white, and has a bitter taste. It is soluble in ether, alcohol, and water. Its salts are also soluble in water, and they are precipitated by the double iodide of mercury and potassium. When treated with concentrated sulphuric acid the alkaloid dissolves the solution, assuming a maroon discoloration, which gradully fades into an intense green, and with a solution of perchloride of iron a deep yellow colour is produced. Besides the alkaloid above described, we found in *Ustilago maydis* the following constituents:—

	Petroleum spirit extract. Per cent.
Fixed oil	6·50
Resin	8 00
Wax	5·50
Chlorophyll	trace.
	Ether extract. Per cent.
Trimethylamine	1·50
Sclerotic or mæsenic acid	2·00
Wax	6·25
Resin	4·50
Chlorophyll	trace.

Sclerotic acid crystallizes in needles.

Sclerotic acid is soluble in water, alcohol, and ether. It decomposes the alkaline carbonates, and its salts are crystallizable.

	Alcohol extract.
Sclerotic acid	0·50
Resin	3·50
Chlorophyll	trace
	Aqueous extract.
Sugar	3·75
Pectine	2·25
Salts	4·00
Extractive	9·50

Now, whether trimethylamine exists in corn smut ready formed, or whether it is a product of the decomposition of the albuminoids when treated with caustic alkali, is still an open question. In our opinion it is not a product of decomposition, for this base is given off when an ethereal or alcoholic solution is evaporated at a low temperature without the use of a caustic alkali. Besides the crystalline body, we also obtained a non-crystallizable body that had an alkaline reaction, which we will investigate more thoroughly in the future. The quantity of the alkaloid is very small, but of course a great deal was lost in the purification.

Physiological action.—The physiological action of this drug is the same as ergot, consequently is indicated in protracted labour, inertia of the uterus, hæmorrhage of the same organ, in amenorrhœa, dysmenorrhœa, and capillary hæmorrhage of the internal organs.

The best form of administration is the fluid extract, the dose of which is thirty drops to one teaspoonful.

THE CLOVE TREE.*

The clove tree (*Caryophyllus aromaticus*), says Rumphius, "appears to me the most beautiful, the most elegant, and the most precious of all known trees." In form it commonly resembles the laurel, and sometimes the beech. Generally of the height of an ordinary cherry tree, its trunk is straight, and rises to four or five feet before it throws out branches. The bark is smooth, thin, and adheres closely to the wood, which is hard and strong, but of an ugly grey colour, and, therefore, not suited for cabinet work. In the commencement of the wet season, which is the month of May in the native country of the clove, the tree throws out a profusion of new leaves. Soon after the germs of the fruit are discovered at the extremities of the young shoots, and in the four following months the cloves are completely formed. The fruit, at first of a green colour, assumes in time a pale yellow, and then becomes of a blood-red colour, if of the most ordinary variety. It is at this period that the clove is fit to be used as a spice, and of course this is the period

* From the *Indian Agriculturist*.

of the clove harvest. It is not, however, the period of the full maturity of the fruit, which requires three weeks longer to perfect itself, and serve for the purposes of propagation. In this short period the fruit swells to an extraordinary size, loses much of its spicy quality, and contains a hard nucleus like the seed of the bay. This state of the fruit is what Europeans call the mother clove, and the natives *poleng*.

There appear to be five varieties of the clove, viz., the ordinary cultivated clove, the clove called the female clove by the natives, which has a pale stem—the keri, or loory clove, the royal clove, which is very scarce, and the wild clove. The first three are equally valuable, as spices, the female being considered fittest for the distillation of essential oil. The wild clove has hardly any aromatic flavour, and is of course of no value.

Of all useful plants the clove has perhaps the most limited geographical distribution. It was originally confined to the five Moluccas islands, and chiefly to Machain. From these places it was conveyed to Amboyna a very short time only before the arrival of the Portuguese. The portion of Amboyna called Leytimeer, and the Uliasser islands, produced no cloves until the arrival of the Dutch, by whom the cultivation was restricted to Amboyna, every effort being made to extirpate the plant elsewhere. To what distance from the parent country the culture might be successfully extended, there has been no opportunity of ascertaining.

Rumphius informs us that the plant is not partial to large islands, and does not answer well in Gilolo, Ceram, Beuroe, or Celebes. It is probable that Beuroe and the Xula isles are the utmost western limit of the successful culture of the clove. The same writer adds that the Javanese and Maccassars, when they were the carriers in the spice trade to the western emporia of the Archipelago, conveyed to their own country with great care young clove plants and mother cloves, from which trees were reared that produced no fruit. Through the speculative enterprise of Europeans the clove has in latter times been cultivated so as to bear fruit in some of the western parts of the Archipelago, in the Mauritius, and in the West Indies. They have been cultivated for nearly fifty years in the Mauritius, where they bear fruit of inferior quality and high price. The fact seems to be that, like the grape, but in a much higher degree, the clove may be raised at a heavy expense, and of inferior quality, in soils and climate little suited to it. How wonderfully restricted the soil and climate of the clove is may be gathered from this well-known fact, that in the parent islands the tree yields fruit in the seventh and eighth year of its growth, and grows almost spontaneously without care or culture, whereas at Amboyna, where it is an exotic, it does not bear until the tenth and twelfth year, and demands very considerable attention.

The clove neither thrives well near the sea, where it suffers from the spray, nor in the higher mountains, where it suffers from the cold. The soil which suits it is a dark loam, having underneath a layer of dusky yellow earth, intermixed with gravel. A sandy soil, a hard clay, and the wet ground in which sedges grow are to be avoided. The tree may be propagated either directly from the mother cloves, or by transplanting the younger plants found in the clove gardens from the natural propagation of the seed. The plants raised by the first method grow luxuriantly, but are alleged to yield more leaves than fruit, and, growing remarkably straight, to be difficult to climb for the purpose of reaping the harvest. The trees propagated by the latter method are preferred, but the culture is laborious, and the success of the operation uncertain until the plants have attained the height of five or six feet. The young plants at first require the shade of other trees, and must therefore be planted among them. As they grow up the other plants must be removed, leaving here and there a few fruit trees, such as the kanari and the cocoanut, etc.; the neighbourhood of which, it has been discovered, is favourable to the clove. The clove trees must themselves be kept pruned, and care be taken that they are not choked with weeds, or by too many of the fruit trees just mentioned, in failure of which attention the plants will languish, or degenerate into wild cloves.

Such is the culture requisite in Amboyna, a soil and climate foreign to the plant, where comparatively much care and attention are required. In its native country, on the contrary, the clove grows luxuriantly and almost spontaneously, being propagated and coming to perfection with hardly any culture. In its native country, the clove tree, as already mentioned, begins to yield fruit in the seventh or eighth year, but at Amboyna not until the tenth or twelfth.

Examples are given of clove trees living to the age of one hundred and thirty years, but the ordinary duration of its life in Amboyna does not average above seventy-five. Much depends upon the nature of the soil and ground in which the tree has taken root.

The clove, though generally a hardy plant, suffers from excessive drought, and is apt to be destroyed by the depredations of a worm which insinuates itself into the wood and kills the tree. In particular seasons thousands perish from this cause.

The reaping of the clove harvest is perfectly simple. When the fruit begins to grow red, the reaping is begun. The ground underneath the tree is clean swept. The nearest clusters are taken off with the hand, and the more distant with the assistance of crooked sticks. Great care is necessary that the trees, in this operation, should not be rudely handled, as an injury offered to them in this way would prevent them from bearing for years. The curing of the cloves consists in placing them for some days on hurdles, where they are smoked by a slow wood fire, which gives them a brown colour, and afterwards drying them in the sun, when they turn black, as we see them in the article of commerce. In some places they are scalded in hot water before being smoked, but this practice is not common. Such cloves as casually fall on the ground and are picked up in small quantities the cultivators do not think it worth while to subject to the process of smoking, and they are merely dried in the sun; they are discoverable by their shrivelled appearance, and are of inferior value. The period of harvest is from October to December.

Of the fecundity of the clove it is not very easy to speak distinctly. The produce from one year to another is very unequal. At intervals of from three to six years they usually yield one extraordinary crop, but then a year now and then intervenes when they do not bear at all. At other times, again, they will give a double harvest. Some extraordinary instances of fecundity in particular trees are quoted. Rumphius and Valentyn speak of a remarkable tree, a hundred and thirty years old, which one year gave the enormous crop of eleven hundred pounds and another year half this quantity. About the proportion of two-thirds of a clove cultivation is considered to be bearing trees, the remaining third being allowed for barren and young trees. According to the present mode of culture, perhaps, it would not be safe to average the production of all trees at above five pounds.

According to the data the produce of an acre will be 375 pounds avoirdupois, and deducting one-eighth for young trees under ten years, 328 pounds. By a free culture, as in the case of pepper, a much larger produce than is here stated would no doubt be obtained.

A GLIMPSE AT PHARMACY IN THE SEVENTEENTH CENTURY.

BY C. J. S. THOMPSON.

Very little seems to be known, and not much has been recorded of pharmacy in the stirring times of the Roundhead and the Cavalier. In those eventful and historic days, when the art had not yet emerged from the superstition and charlatanry in which it was enveloped, the

apothecary's practice consisted in a combination of medicine and astrology. The forms in which drugs were administered were often of a strange nature, and of a very crude description. The ancient medico believed in the administration of physic in quantities which, in these advanced days of infinitesimal doses and concentrated preparations, would be considered something alarming.

The following interesting extract is from the diary of William Blundell, a celebrated cavalier of Lancashire, who took an active part in many of the conflicts in Cromwell's time. On being taken ill, we are told, he sent for his medical man, one Dr. Worthington, of Wigan. The doctor's bill, together with some quaint remarks thereon, are entered in the cavalier's diary by his man Master Thelwall, and run as follows:—

1681. "After my master had been long ill of a violent cold, Dr. Worthington came first unto him on January 8th. He staid two nights, and received for his pains £1 10*s*. He brought along with him, a Lohoch, ten pills, with a bottle of spirits somewhat bigger than ones thumb, and a paper of lozenges, with French barley and several ingredients for making the water thereof. On the 11th day he sent a glister, with a large pint bottle of a cordial julep, and a small bottle of syrups, to be sucked up with a liquorice stick, also some small quantity of Sal prunella.

"The doctor was with my master the second time, on January 17th, and received for his pains 15*s*."

Then comes the copy of——

Dr. Worthington's Bill, dated—

October 24, 1681.

	£	*s.*	*d.*
Spirits	0	4	6
An ointment	0	1	4
January 8.			
Spirits	0	4	6
Ten pills	0	2	0
A Lohoch	0	2	0
Lozenges	0	4	0
Jujubes and sibertines	0	0	8
French barley	0	1	0
Ingredients	0	1	6
Syrups	0	3	0
A cordial julep	0	10	6
A Glister	0	2	6
January 11.			
Syrups	0	3	0
White powder	0	0	4
Five pills	0	1	3
The oiled Sugar	0	7	0
Syrups	0	5	6
Oil of sweet almonds	0	1	8
Spirits of Ptisanne	0	7	6
For a messenger	0	1	6
	£3	5	3

Master Thelwall then goes on to say: "My master's opinion of these several things in particular, is here to be inserted for further use, viz., that the spirits first named, of which twenty-six drops were put into one small cup of barley water and beer, had no apparent effect, although he doth not much doubt but the secret effect might be good. That the like might be said of the pills, mentioned in two places, although it seemed that they did somewhat assuage his cough, which was extremely violent. The lohoch, a liquor like syrup, did apparently bring up phlegm, and was well liked. The lozenges were pleasant, and did sometimes stop the cough. Barley water with the ingredients was cooling and pleasant. Syrups twice mentioned, although of much different prices, seemed to be the same.

"The cordial Julep, of which there was a large pint bottle, was pleasant, but the effect not apparent. The Glister extraordinary effective and good. White powder, supposed to be Sal Prunella, assuaged the thirst. The oiled sugar, with the spirits ptisanne, besides the extreme dearness, was almost wholly useless, in regard that the patient being much in the mending hand, when they were sent unto him. He sent back to the doctor about seven-eighths of the oiled sugar, and yet he paid for the whole. The oil of sweet almonds, of which seven or eight drops were taken in a bolus of white sugar candy, frequently helped the breast made very sore by coughing."

We subsequently learn the good old cavalier was at length cured of his ailments, which he certainly ought to have been, from the multiplicity of the remedies employed. Most of the forms in which medicine was adminished in those days have entirely gone out of use, and others we have still with us.

The lohoch, the base of which was honey or thick syrup, was a very favourite form of medicine for a cough, such as the lohoch demulcent, lohoch of fox's lung, and lohoch expectorant.

The julep was another ancient form of administration, which was much in vogue. Balsams, of divers compositions, had great repute as expectorants. William Blundell in his diary (1681) mentions, "The Elder Lady Bradshaw sent a bottle containing, as we guess, about one ounce of balsam, which, in her letter, she calls 'Balsam of Sulphur.' That it must be taken morning and night, three or four drops, naked and alone in a spoon, that it must be warmed before it will drop at all, by reason its thick and clammy." The sugared oils were simply made by triturating various essential oils with white sugar, and usually given for their carminative action.

Another favourite vehicle was broth composed of many and strange ingredients. We have come across the broth of calves' lungs, broth of the bones of lizards, and broths made from snails, tortoises, woodlice, crabs and vipers.

The recipe for the broth of viper we have taken from an old black-letter book, and is rather curious:—

℞ Living viper . . . . . j.

"Remove his head, tail and viscera, excepting his heart and liver, cut it into little pieces and mix it with the blood, and add—

Well water . . . . . 12 ounces

in a close vessel, boil for two hours, and strain, and the broth will be made."

The materia medica of the old apothecary was largely drawn from the animal kingdom, and the greater part of it being, no doubt, handed down from a much earlier period, when witchcraft and superstition exerted such a powerful influence on the minds of the people.

In the days when the monks ministered to the physical ailments of the people, and the housewife had a recipe at her finger end for every disease that flesh is heir to, the herbs and simples they employed were mostly confined to those things that grew round about them. Among the most curious things used we find the liver of a mad dog, or a wolf, washed in wine, and dried in a stove, was a supposed remedy for hydrophobia. The nimble lizard had a reputation as a sudoritic and antisyphilitic. Dried toads, and the cast off skins of snakes and adders, were administered in dropsy as a diuretic.

The horn of rhinoceros was used in epilepsy, and goats' blood, and eels' liver, as a cure for dysentery. The oil of frogs' spawn was celebrated as an application for chilblains. The jawbone of a pike, and the spine of a lamprey in powder, were prescribed for leucorrhœa. Pepys mentions in his diary that he wore a hare's foot as a sovereign remedy against the plague, in which charm he seemed to place more faith than in the various plague waters that were recommended to him, as unfailing antidotes for that terrible disease.

Gradually as the years have rolled on, science and chemistry have shed their searching light and unlocked the marvellous resources and products of nature, most of these old relics of the days of superstition and witchcraft have been left behind and forgotten, and it remains only for some old black-lettered tome to tell the story and fill in the background to the picture.

The Pharmaceutical Journal.

SATURDAY, AUGUST 20, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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BRITISH PHARMACEUTICAL CONFERENCE.

THE time appointed for the meeting of the British Pharmaceutical Conference in Manchester being now near at hand, it will probably be convenient to our readers to be informed as to the general arrangements that have been made for the occasion. Through the courtesy of the Honorary Local Secretary we are now enabled to give the following details of the programme of local arrangements. On Monday the 29th inst., there will be a reception of the members by the President and other officers of the Conference. This will take place at 8 p.m. at the Grand Hotel, Aytoun Street, and it will be followed by a conversazione, at which music and light refreshments will be provided. A meeting of the Executive Committee will be held at 10 p.m. the same evening at the Grand Hotel, which will be the headquarters of the Conference during the meeting.

The general meetings of the Conference will be held in the Chemical Theatre of the Owens College on Tuesday and Wednesday, commencing at 10 o'clock in the morning, and conveyances will start from the Grand Hotel each day at 9.30 a.m. to take the members to the place of meeting. The address of the President, S. R. ATKINS, Esq., J.P., will be delivered on Tuesday morning, and afterwards the reading and discussion of papers will be proceeded with. At 1 o'clock there will be an interval of an hour for luncheon, which will be provided in the College grounds, and at 4 p.m. conveyances will start from the College to take members to the Exhibition, where the chemical section, of which an account has already been given in this Journal, as well as the machinery in motion, the collection of paintings and the gardens, will certainly be found to present sufficient attractions to occupy the remainder of the evening.

On Wednesday the reading of papers will be continued at the second general meeting, and as on the previous day, luncheon will be provided at one o'clock in the quadrangle of the Owens College. The time from the close of the meeting on Wednesday has been left unappropriated, so that members who may wish to pay a second visit to the Exhibition can either do so or be free to attend the address of the President of the British Association, which will be delivered at the Free Trade Hall. On the evening of Wednesday, however, it is proposed that there should be a smoking concert or social meeting, held at the Grand Hotel, commencing at 9 p.m.

The following is a list of the papers promised for the meeting :—

1. Contributions to the Knowledge of Catha Leaves. By Professor FLÜCKIGER and J. E. GEROCK.
2. Quinological Work in the Madras Cinchona Plantations. By DAVID HOOPER, F.C.S.
3. On two Species of Vesicating Beetles from South Africa. By J. O. BRAITHWAITE.
4. On the Chemistry and Pharmacy of some of the Morphine Derivatives. By D. B. DOTT, F.R.S.E., and S. RALPH STOCKMAN, M.D.
5. A Method of Detecting and Estimating Salicylic Acid in Wines and other Liquids. By WALTER H. INCE, A.I.C.
6. Report on Blaud's Pills. By T. MABEN.
7. Relation of Pharmacy to Medicine. By D. J. LEECH, M.D.
8. On the Chemistry of Logwood. By LOUIS SIEBOLD, F.I.C., F.C.S.
9. The B.P. Preparations of Logwood. By LOUIS SIEBOLD, F.I.C., F.C.S.
10. Cryptopine and its Salts. By Dr. E. KAUDER.
11. Note on the Estimation of Ipecacuanha. By F. RANSOM.
12. A Short Note on English Rhubarb. By W. ELBORNE.
13. On Nitrites and Nitroglycerine. By G. A. ATKINSON, M.D.
14. A New Method of Preparing Aconitine. By JOHN WILLIAMS, F.I.C., F.C.S.
15. Note upon the Testing and Purification of Hydrochlorate of Cocaine. By JOHN WILLIAMS, F.I.C., F.C.S.
16. Examination of Commercial Cocoa Butter. By E. J. MILLARD.
17. Notes on Crude Carbolic Acid and Carbolic Powders. By A. H. ALLEN, F.I.C., F.C.S.
18. Oil of Evodia: A New Deodorant for Iodoform. By H. HELBING.

The number of papers is scarcely so large as it has been on some previous occasions, but the subjects dealt with are of sufficiently high interest to leave little doubt that this part of the Conference proceedings will in no degree fall short of what may be expected of a meeting held in Manchester.

The programme for Thursday which is to be more especially devoted to recreation after the work of the two preceding days, gives the particulars of the arrangements for the Conference excursion to Matlock Bath. Members intending to join this excursion are to assemble at the Manchester Central Railway Station at 9 a.m., where they will find a special train provided for them that will leave the station at ten minutes past nine, and passing through the famous Derbyshire High Peak district will afford a good view of its fine scenery. On arriving at Matlock Bath it is proposed to ascend the High Tor and

occupy any spare time in visiting the caverns, Roman mines, etc., until one o'clock, when luncheon will be served in the Matlock Bath Royal Hotel. At 2 p.m. carriages will start from the Hotel for a drive in the neighbourhood, and after tea the party will return to Manchester by special train leaving Matlock Bath Station at 6 p.m.

It has already been mentioned that two books of tickets are being issued by which the members of the Conference will obtain admission to the various meetings and to the Exhibition, etc, and we are requested by the Honorary Local Secretary to do what we can to induce intending visitors not to postpone their application for these tickets until their arrival in Manchester, but to apply for them by post a few days before the meeting takes place. A little reflection will suffice to make it clear that the Local Secretary who has undertaken to make the arrangements for the meeting and to provide for the entertainment of the visitors will in any case have a somewhat arduous task to perform. It is therefore very natural that he should desire to avoid any undue concentration of the work to be done and to get the required tickets distributed beforehand as much as possible. To facilitate applications for tickets in the manner desired we again give the particulars respecting them.

No. 1 entitles the holder to the President's reception and conversazione, the conveyances and luncheons on Tuesday and Wednesday, besides admission to the Exhibition and to the smoking concert; application for this is to be accompanied by a remittance of five shillings.

No. 2, entitling the holder to the excursion on Thursday, includes first class railway fare, carriage drive, luncheon, etc., with admission to places of interest in Matlock, and application for this is to be accompanied by a remittance of ten shillings.

We understand that the applications for these two sets of tickets are already numerous, and that there is every prospect of the Conference meeting being a large one.

"HEAVY QUININE."

THE bubble of "heavy quinine" has at length been pricked by its propagator, and it must henceforth rank with the mountain in labour. From a report of the meeting of the Société de Pharmacie on the 8th of July in the *Petit Moniteur de la Pharmacie*, it appears that Dr. DE VRIJ revoked the statements he had made on the 5th of May, 1886, that pure sulphate of quinine could only be obtained in heavy crystals, and that the ordinary filamentous condition in which this salt is generally known was a certain indication of its impurity and of the presence of cinchonidine sulphate. Last year Dr. DE VRIJ was travelling with a sample of the "heavy quinine" manufactured by a French firm, and pharmacists as well as medical men were led to believe that to be the only pure salt. Now this is declared to be a total mistake and the situation is entirely reversed. Dr. DE VRIJ has been obliged to admit that pure quinine sulphate can be obtained in the light filamentous condition that is familiar to everyone, and he is now travelling with a sample of German make to show that this is the case. We think he might easily have obtained evidence of this fact and of his own error in respect to it without travelling either to France or Germany for that purpose. But it is at least satisfactory to find he is converted, and also that there is really no occasion for pharmacists to be in fear that the light quinine sulphate they have been accustomed to is to be distrusted on account of its levity. It is, however, unfortunate to find that a criterion of purity held out so positively and with such apparent authority as to have induced Professor JUNGFLEISCH to recommend that no other than "heavy quinine" should ever be accepted by pharmacists, turns out after all to be delusive. To say nothing of the inconvenience that may have been caused to makers and others, such an occurrence is a little apt to lessen the respect for "authorities," and to show that TALLEYRAND'S advice not to indulge in too much zeal is not only applicable to young men.

In the House of Commons orders of the day for Monday, the Pharmacy Acts Amendment Bill stood somewhat about the middle of the list, but it had not been reached at the time when, as an opposed measure, it could be taken. In the subsequent papers no mention of the Bill appeared, and on inquiry at the House we were informed that the Bill had been "dropped." No doubt there are some of the craft who will rejoice at this result; but we trust the majority will at least recognize in it a consequence of the want of that union by which alone any effective representation of a class is possible.

* * *

We understand that Mr. Haydon is so far fairly satisfied with the progress he has made in establishing his "Chemists' Defence Agency." The conditions of membership he puts forward indicate a proper determination on his part to be adequately supported in the work he has undertaken, and in adopting for his motto "Unity is Strength," he touches the weak point which we hope his enthusiastic energy may help to obliterate.

* * *

The German Apotheker-Verein will hold its annual general meeting this year at Munich, under the presidency of Dr. Chr. Brunnengräber, from the 29th inst. to the 1st September. The first three days will be devoted to the business proceedings, and on the fourth day of the meeting there will be an excursion to Starnberg.

* * *

We regret to have to record the death of Mr. William Sinclair, one of the old Scottish members of the Society. The deceased was in his 79th year, and had long been in business at Upper Kirkgate, Aberdeen.

* * *

Pharmaceutical cricket, which has been for some time past popular with the students of the School of Pharmacy, appears to be finding favour in the provinces, as we learn that the Midland Counties Chemists' Association are to play a return match, married *versus* single, at Cannon Hill Park on Wednesday, the 24th inst. Wickets pitched at 2 o'clock.

Proceedings of Scientific Societies.

THE EAST INDIA ASSOCIATION.

The Commercial Products of Assam.

BY O. WEYNTON.

(*Concluded from page* 147.)

Cajpat—generally called caiaputer—the *Melaleuca cajeputi* of Roxburgh, is a small tree with a twisted, crooked stem, scattered branches with a drooping tendency, similar to the weeping willow. It is rather sparsely distributed throughout the province—chiefly at the entrance of ravines, but to avoid an expensive search, may be procured either from Dacca, in Goalpara, under the Tipperah Hills near the station of Comilla, Jaintiapur, and, in fact, almost any locality where ruined temples abound, as in such places, in days gone by, it was carefully looked after, its medicinal properties being well known to the priests and native practitioners, though they seldom extracted the oil, but used the hot bruised leaves as applications in sprains, bruises and rheumatism. The tree takes three years to reach maturity, but slips may be planted close together so as to form a nursery, and until planted out in the permanent situation destined for them, may be constantly cropped (according to judgment) in that condition, so that returns may be had in eighteen months from the time of laying down the slips. The leaves are to be collected on a fine warm day, say from April to September, lightly rolled to break the cells, then chopped up fine, macerated in water for twelve hours; strained and the liquor distilled in a glass or enamelled still. The result will be a pure limpid oil with a light green or bluish tinge and an odour quite distinct—the caiaputer oil of chemists. It is apt to discolour if exposed to light, and should therefore be packed as soon as convienient, but, pending which, may be stored in large closely-covered earthern jars kept in a dry, dark place. There is considerable local demand for this oil, not only among the native population of Assam, but in both Munnipoor and Burmah, as also down country, and it is more than probable that the whole of one's out-turn, until it assumes large dimensions, could be profitably disposed of within the country. Once established, the cost of cultivation is but nominal, the preparation inexpensive, and the returns handsome. The plant may be grown on almost any soil above swamp-mark, and scattered about in any unused plots of the grounds, placed in topes or groups sufficiently numerous to afford leaf for one day's systematic plucking—not isolated trees stuck about here, there and everywhere, necessitating an extensive roaming on the part of the gatherers.

Chaulmoogra—Gynocardia odorata, or the Ta-fung-yu of China, is a handsome tree supposed to be peculiar to the northern part of the Sylhet district—merely, I presume, as expressing the oil once formed one of the jail industries there; but it may be found in all ravines in which the primeval forest remains intact, in either of the mountain ranges from Gowhatti to the Brahma Khoond, and from the Laor River to the Khuboo Valley, as also in the deep semi-tropical forest gullies, in the Khassia, Garrow and N. Cachar hills. Were exploration safe, I have little doubt that it would be forthcoming in the northern ranges and Upper Burmah, as the expressed oil forms, under the name mentioned above, a large item of export from Laichung in Western China. Among the Chinese, Ta-fung-yu has for ages been regarded as a specific in syphilitic and kindred diseases, being, when mixed with ground cinnabar, applied externally to the parts affected, the pure oil used for injection; it possessed the property of disinfection, and drying without causing obstruction or any unsightly cicatrice; wounds and ulcers treated with it closing with an evenness that hardly leaves a trace behind—Chinese medical men asserting that treatment with chaulmoogra entirely prevents the copper-coloured stain peculiar to the site of wounds caused by the diseases alluded to. Whether the whole of the therapeutic properties claimed for it would stand all tests, experience must decide, but all over the East, where cutaneous maladies, from leprosy down, are so prevalent, unbounded faith in its virtues exists, and so esteemed is it in Persia and the countries adjacent that either at Shiraz or Bushire one rupee per ounce is readily paid by dealers from the interior for it. The water tetter, or ringworm from which new-comers from Europe to Assam almost universally suffer, rapidly yields to the mixture of chaulmoogra and cinnabar, and though mercury in any form is specially dangerous to deal with in warm climates, I have never yet heard of the slightest symptom of salivation arising from the use of the combination. In China a 6-grain pill made from the seed is sometimes given, but with what object I am unable to say, as the smallest quantity induces nausea and vomiting. The blossom appears in April and May, and the fruit, which takes the form of an oblong nut—not much dissimilar in shape to a Brazil nut—ripens towards the end of the rains, is smooth and of a greyish colour, yielding on cold pressure 10 per cent. of rather thick resinous oil. Although it bears in the fifth or sixth year the tree attains the size of a full-grown mango, so that wide planting is necessary, but beneath its shade other plants may be raised. The usual method of opening out the roots in March and heavily manuring with ash, stable dirt and pounded limestone will bring out a prodigious amount of blossom, but it is better not to resort to the practice yearly, until, at any rate, the tenth or twelfth season; every alternate year until then being as much forcing as the tree will bear with impunity. The cake, obtained as it is without heat to deprive it of all medicinal properties, may be ground into meal and used for poultices, being from its nauseating qualities unfitted for cattle feeding; although I have given it to pigs, who readily consumed it without any apparent deleterious effect. Chaulmoogra needs but an introduction in sufficient quantities to create a considerable demand, and its being a native remedy has, I opine, been the chief cause of its neglect among professional men who are apt to condemn all such without unprejudicially first giving their reputed merits a fair trial.

Dipterocarpus, or the tree that furnishes the *Gurjan* oil, or rather oily resin, is now difficult to find in the more accessible parts of Assam, but, as the intending settler of the present day will most likely have to locate himself in the veritable backwoods it is very probable that some of these highly valuable trees that have escaped the jungle roamer may be found in his concession. Any native can point them out, but raising from seed, it must be borne in mind, must be undertaken in the interests of posterity, for the tree grows to a great altitude, generally shooting up to the height of forty feet ere throwing out branches. Those met with in the forests fit for tapping are presumedly some forty to fifty years old, and of late years the gatherers have not only been content to tap the trees to death, but have in many cases actually felled them, trying out the billets in so ruthless a manner that pitiable wholesale destruction has been wrought; still Gurjan is found, though one must go further afield for it, searching the hill ravines. It is very plentifully distributed in the deep valleys of the Looshai hills, and reported by the inhabitants to abound far in the interior, the crude resin finding its way to the markets on the Chittagong side of those hills; but a considerable number of untouched trees may be noticed in the valley of the Kopoli and also in the forest round about the Brahmakhoond. These localities are merely referred to as seed-collecting centres, for to gather the sap from a tract of country so wide as that over which the dipterocarpus is distributed would prove not only too expensive, but might lead yourself and collector into dangerous places. The seeds ripen in October, and should be sown as fresh as they can be pro-

cured—for they rapidly lose their germinating power. Raised in nurseries until the wood is sufficiently matured to bear transplanting, the young saplings may be placed out in the jungle and left to nature, a record of the date and site of planting pigeon-holed for the benefit of future generations, as the planter of dipterocarpus can hardly hope himself to reap the benefit of his own plantings. If one or more mature trees are found on the grant the resin may be abstracted any time from November to May in the following manner :—One or more oblong perpendicular holes are made at a convenient distance from the ground—two feet long by six inches broad—cutting well into the body of the tree through the bark ; at the lower end a cup-like cavity must be scooped out of sufficient capacity to hold a fluid quart ; fire is then introduced and kept up with charcoal for from two to three hours until the cavity is thoroughly well charred ; on cooling the Gurjan commences to trickle out, needing baling night and morning ; should there be a falling off in the exudation, more charring will stimulate it, though the better plan will be to open a fresh hole on the opposite side of the tree, and thus working both alternately. The yield per annum from a fully matured tree—maturity being approximately indicated by a height of seventy feet and girth, four feet from the base, of eighteen feet—was 346 pounds. Gurjan oil is the best varnish for all woods known throughout the East, and well rubbed into teak with the husk of cocoa-nut, gives a polish to that and other dark timber rivalling that shown by mahogany or walnut, while the surface oil applied in a similar manner to light-grained woods is attended with equally brilliant results. Mixed with lampblack and applied to carved teak, a good many imitations of the celebrated Surat blackwood furniture are palmed off on the globe-trotting curiosity purchasers, but it looks equally well. Perhaps one of the most valuable preservatives of wood work is the combination of Gurjan and ground sulphate of copper, which, boiled to the consistency of a thick syrup, and applied hot to any timber—whether imbedded in the earth or not—effectually prevents the attack of white ants and borer, resisting, also, the exigencies of a damp climate, and would thus, doubtless prove of value in the preservation of railway sleepers. As a cosmetic it imparts a delicate softness to the skin, but has a somewhat medicinal odour that would need eliminating or concealing with some counteracting perfume ere it found favour among such Europeans as indulge in those luxuries. Mixed with *neem* leaves it forms a most powerful poultice, and natives claim for it certain medicinal qualities possessed by matico and copaiba, the details of which it is unnecessary to enter into.

Croton Oil.—Croton Tiglium, from which the croton oil is obtained, is found in all parts of the province, being more plentifully distributed in the drier districts. Though the family of the crotons is a numerous one, there is no difficulty in distinguishing the tiglium, which has the smallest leaf. The native name is *Jummul ghùti*. There being but a small demand for this oil only a limited area need be devoted to it, and as the plant is apt to spread it will require, occasionally, weeding out or otherwise keeping down. If, however, you elect to manufacture the oil, it will be as well to bear in mind that you are dealing with a most powerful irritant poison, which in any stage of preparation should not come in contact with the hands or other part of the body or even the clothing ; the special press retained for its extraction should therefore be kept, and all manufacture conducted, in a separate hut. The process of extraction is cold pressure between plates similar to those used in castor oil ; when run off croton should stand for fifteen days, then filter through charcoal and pack in small bottles or tins. All refuse had better be burnt, and the plates and other paraphernalia scrubbed with ash lye with a long-handled brush kept especially for the purpose.

Many economic plants that now receive but passing attention ought to be brought either from the jungle or native homesteads and placed under observation, for many, used in their crude state, undoubtedly possess highly valuable properties that, owing to want of chemical knowledge, natives do not utilize to the full extent of such capabilities. Like the despised "old woman's" remedies in more civilized countries, unexpected valuable results are often obtained therefrom by painstaking chemical research. One's ears and eyes should be always open in Assam, and, given as natives are to romancing, there is generally some modicum of truth at the bottom of the wildest romance. The wealth of the province has by no means been thoroughly disclosed, for the simple reason that exhaustive explorations, either botanical, geological, or by naturalists, have never been attempted ; but all investigations have been conducted in the most perfunctory manner ; when one item was reported some one was sent to the particular locality to report upon that particular item, having done which his duties were considered at an end. Hence, Government incurred great expense in deputing the late Mr. Fortune to China to procure a deteriorated tea seed to plant in the land from which it had originally been taken nigh two thousand years before, though the history of its transport from Assam to the "Flowery Land" by a Buddhist pilgrim has formed a well-worn theme among the story-tellers of the Indian bazaars for ages past. Again, botanists were sent to South America to introduce cinchona and ipecacuanha, yet *Cinchona crispa* grows wild on the summit of the forest-clad cliffs that overlook the plains of Sylhet and Cachar at an elevation of some 1500 feet, and ipecacuanha is found in abundance in the Larnai Valley within a dozen miles of Shillong. Nothing, therefore, should be considered too trivial for investigation, though neither of the latter plants referred to are likely to be attended with successful cultivation below the elevations indicated as their true *habitat*.

Pàn, the well-known leaf of the betul vine masticated by all natives of India, seems never to have attracted that attention which its undoubted valuable qualities should ere this have commanded. When one reflects that men carrying heavy loads travel long distances in the hottest weather exposed to the full blaze of a tropical sun or get through laborious tasks with no other sustenance than the mastication of this leaf, it is evident that it must contain some wonderfully stimulative properties well worth careful investigation ; anyone can test these for himself, and although most natives use some half-dozen ingredients in conjunction with the leaf, a little consideration will show that such may be regarded merely in the same light as sauces with solid joints, and that in the juice of the pàn leaf lies the stimulant. A leaf, taken when one is suffering slightly from the influence of the sun or fatigue, acts immediately as a restorative, quenching thirst and imparting an agreeable glow to the throat and regions of the face and head generally, without any deleterious *sequelæ*. Although it would not be possible to introduce the leaves themselves to Europe, and, in fact, their mastication would hardly find favour, an extract or tincture, if the properties noted could be retained therein, would not fail to be appreciated, especially among those with whom a non-intoxicating stimulant is a *desideratum*. Pàn leaf, bruised, when applied to cuts and wounds arrests bleeding, cleanses from all suppuration, besides promoting granulation in the most ugly hurts ; hence it is reasonable to infer that, it must possess medicinal qualities that should recommend it to the notice of the faculty. It is needless to enter into details connected with the cultivation, as such may be seen in operation all over Assam, the favourite sites in the plains being the banks of rivers, but the best and most pungent leaves are those from vines planted in the limestone rifts in the hills. Shade is imperatively necessary, and, in the dry weather, systematic irrigation also, but the vine will not thrive under the drippings of dense umbrageous trees, and good

drainage is essential to its well-being. The care bestowed upon it by such eminently careless cultivators, in most respects, as Bengalis sufficiently indicates its delicate nature, as does the large area devoted to the raising of it, the remunerativeness of its culture.

The *Areca palm*, erroneously and almost universally called the betul-nut tree by Europeans, may be planted in any flat land, but not swamp, in and around the property at distances from 6 feet to 8 feet apart. The large demand for areca nuts all over India and the East renders the establishment of these plantations highly profitable, but as Europeans hitherto have been but "birds of passage" in Assam none have cared to plant, hence the cultivation is almost entirely confined to natives. But when once rail communication with Chittagong gives the province its long-needed seaport the demand for areca nuts will form an important item in its exports, coastwise. The tree is best raised in nurseries, and may be planted out the following season. It attains a height of from 40 feet to sometimes 60 feet in the course of ten years, but bears the fifth, and although that may seem a long period to wait for returns. Once *in situ* no cultivation whatever is required, and the factory's appearance cannot fail to be greatly embellished by the presence of this most graceful of all the palms, which an eminent botanist has likened to "an arrow shot from Heaven."

Vanilla.—The terrestrial orchid that yields the aromatic pods of this spice, though better grown at 1000 feet or 2000 feet above sea-level, may, with care and attention to keeping the young roots clear of ants and other insects, be successfully raised in the plains and trained on the stems of the areca. When once it obtains a firm hold little attention is needed, but should inclination to spread laterally be indicated, such should be encouraged and bamboos, hung by loops from palm stem to palm stem, will afford quite enough support for the ramifying tendrils. The bamboos must not be firmly lashed to the palm-stems, as the areca sways in response to the slightest breeze; thus a certain amount of play must be allowed for. The vanilla will bear well the third year, and the pods must be gathered as soon as they begin to change colour, or they will burst, then dried under an open shed, and are better exported in cases. Each should be wrapped in a piece of clean paper, but those who deem such a proceeding too elaborate may omit it.

Bael or bel is the fruit of a well-known tree that may with advantage be introduced from native gardens, but as the best is grown about Dacca, seed should be imported thence. Bael will yield in the seventh year, and, though its medicinal properties are little known in Europe, there is no doubt that it would make its way in public favour once brought prominently to notice. Its merits lie in the pulp, contained in a hard calabash. The pulp, beaten up with sugar and strained through coarse muslin, has an undeniable regulating effect upon the bowels specially valuable when choleraic complaints manifest themselves. Anglo-Indian chemists manufacture a dried preparation of this fruit, called "dietetic bael;" but much of the virtue of the pulp is lost during the process, and for export the form of preserve should invariably be adhered to. At the same time the fact should not be lost sight of that as it is a medicine rather than a condiment; sugar or other preservatives used in the preparation should only be resorted to as sparingly as is consistent with the preservation of its therapeutic properties.

Nux Vomica, under the name of *Koochela*, from the buttonlike seeds of which the alkaloid strychnine is obtained, is found growing wild in many parts of Assam, in such abundance in one part of Cachar as to give a name to an isolated block of lava-strewn rise, upon which a tea plantation has since been formed; there is no difficulty in obtaining it in any quantity, as all natives know it. Unless one is an adept in chemistry the extraction of the active principle need not be undertaken, but the pods or seeds dried in the sun, and packed in tea chests, for export. If chemical action is resorted to, all utensils used must be kept securely locked up, as strychnine, it is almost needless to say, is a highly dangerous drug to leave about.

Neem.—The neem tree abounds, and the bruised leaves are much in request where strong drawing poultices are required, being specially useful about the mango season, when troublesome boils are so prevalent. An extract, distilled from the leaves, can be made that is of considerable value in stimulating the action of the milder applications, such as bread and linseed meal applications. Native practitioners make use of the neem for a variety of purposes, and as they are not by any means reticent in affording information, investigation and experiment may possibly result in adding another simple, though efficacious, remedy to the British Pharmacopœia.

Doud-ka-putta is a quick-growing tree, allied to the acacias, the bruised leaves of which are applied to the water-rash, which nearly all new-comers to Assam suffer from; but as tamarind leaves have much the same effect, the *doud* may or may not possess any superior qualifications. However, this matter may readily be determined by experiment. A tincture or extract of such sent to an analytical chemist would soon answer the question.

Cassia.—*Cassia lignea* is indigenous to the hills, but whether it would flourish in the plains is not so certain, though the true cinnamon—a few plants—was successfully introduced into Sylhet twenty years since. If you are located in a hill ravine, a small experimental patch may be brought under plant at an elevation deemed suitable; for the cassia, though of much coarser flavour and inferior in other respects, bids fair, at no remote date, to outrival cinnamon either as a spice or oil producer, the general public being hardly competent to distinguish one from the other.

NEW YORK STATE PHARMACEUTICAL ASSOCIATION.

Syrup of Hydriodic Acid.

BY DONALD L. CAMERON.

Hydriodic acid, because of its feeble affinity, rapidly decomposes when in solution, losing hydrogen, iodine being set free. When this occurs it acquires a red colour, and is no longer fit for internal use, being too irritant. To prevent this, or more properly speaking, retard this change (for it is bound to take place if the preparation be kept over six months, oftener at a much earlier period), the acid should be mixed with simple syrup, and the resulting mixture kept at as cold a temperature as possible (35° F.). When iodine is set free, the proper thing would be to throw the syrup away, for to reabsorb the iodine—or, in other words, replace the syrup in its original condition—would require a complete change of its former base, thereby making the syrup stronger; in fact, without a careful chemical examination, its exact strength and quality relating to its component parts could not be determined.

Hydriodic acid (HI) does not exist in nature. For its preparation recourse is had to the decomposition of phosphorus tri-iodide by water $PI_3 + 3H_2O = PO_3 + 3HI$. Red phosphorus is placed in a retort under water, the proper quantity of iodine is then added, and the retort heated. When desired in solution it is recommended by the U.S.P., and it is more readily obtained, by directing a current of hydrogen sulphide through water, holding iodine in suspension $H_2S + I_2 = 2HI + S$, and filtering from the precipitated sulphur.

Hydrogen iodide is a colourless gas, fuming on contact with air, having a strong acid reaction, and a penetrating odour. By cold and pressure it may be condensed to a yellow liquid which solidifies at 5·5° C. It is very soluble in water, one volume of which at 10° C. dissolves 425 volumes of the gas.

Hydriodic acid is decomposed into its elements when heated, the decomposition being only partial, as the ame

influence brings about its partial union of the elements. When a mixture of this acid and oxygen is ignited, iodine is set free and water is formed, and the same action takes place when the mixture is exposed to the sunlight; it is therefore important that this preparation be kept in a dark and cool place, the nearer the freezing point the better. In aqueous solutions it is so unreliable the U.S.P. has dropped it entirely.

In consequence of the doubtful character of this article both medicinally and pharmaceutically, an extemporaneous formula for making the acid is here offered. The resulting acid, added to simple syrup, kept in a cool and dark place, seems to answer all practical requirements, and certainly keeps better than any other form of procedure for the syrup now in the market.

℞ Iodide potassium . . . . . 68 grs.
Tartaric acid. . . . . 60 grs.
Water . . . . . ℥ss.

M. Let it stand on, and surrounded by ice for two hours. Decant 200 m. (minims) of the clear liquid and mix it fl ℥v. of simple syrup, U.S.P. ℥ii. contain one drop of acid hydriodic.

The above formula is at the suggestion of Mr. John A. Dunn, and a sample of which made something over eighteen months ago, and kept in the cellar in a dark corner without a wrapper, is just beginning to show a change. Another sample was made last March, and is of the same formula as sample No. 1. It, however, has been subjected to a more severe test. In consequence of the writer having changed the locality of his business, it has not only been exposed at various times to the light, but also to changes of temperature from hot to cold and *vice versâ* as the occasion might have been, which could not be avoided under the circumstances. With all its drawbacks it still, or does at present writing, June 13th, presents a very favourable appearance.

Extract of Vanilla.

BY CLAY W. HOLMES.

Experienced confectioners assert that the true flavouring principle of vanilla exists only in the pulp, which they employ in the same manner as the pulp of the strawberry and other fruits by direct admixture with cream, the rind of the bean being discarded as worthless. It is a patent fact that the so-called, "extract of strawberry," as well as the extracts of most fruits, is a synthetical compound, hence it is easy to understand why a direct admixture of pulp with the cream should produce the natural flavour. Believing that they reasoned by an ignorant analogy in regard to vanilla, a series of tests was instituted to determine which part of the bean did possess the flavouring quality, and simultaneously to discover the proper solvent.

For this purpose a sample of the finest beans of the latest crop was secured and divided into two portions. The pulp of one portion was carefully removed and the other used entire. Portions of the pulp, rind and entire bean were then weighed carefully, and various menstruums added, as indicated in the following table of samples, preserving carefully the ratio of 1 ounce of vanilla to each pint of liquid employed (except in No. 10, which contains 2 ounces of bean to the pint) :—

No.	Part employed.	Menstruum.			
			Parts.		Parts.
1.	Entire bean	Cologne spirits,	3,	water,	1
2.	Entire bean	Cologne spirits,	2,	water,	2
3.	Outer rind	Cologne spirits,	3,	water,	1
4.	Outer rind	Cologne spirits,	2,	water,	2
5.	Outer rind	Alcohol.....	2,	water,	2
6.	Outer rind	Cologne spirits,	4,	.....	..
7.	Pulp	Cologne spirits,	2,	water,	2
8.	Pulp	Cologne spirits,	3,	water,	1
9.	Pulp	Cologne spirits,	4,	.....	..
10.	Cut bean 2 parts	Cologne spirits,	2,	water,	2
11.	Cut bean 1 part	Cologne spirits,	3,	water,	2
12.	Cut bean 1 part	Cologne spirits,	3,	water,	1

The "cut beans" used in Nos. 10, 11 and 12 were the ordinary cuts of the market, costing about six dollars per pound.

The samples were set aside and allowed to remain at perfect rest for seven days, without agitation, and at the expiration of that time the following results were noted as regards solubility. Menstruum of all (except Nos. 5 10 and 11) clear and unclouded in any part. There seemed to be three strata of solution, the lower varying between one-third and one-sixth the height of the whole body, while the upper two were about equally divided. The following is the record as copied :—

No.	Condition of menstruum as a whole.	Lower strata.	Middle strata.	Upper strata.
1.	Slightly coloured	Dark and satisfac.	Shaded.	Half as deep No. 2.
2.	Coloured	Dark and satisfac.	Tinged deeply.	Fairly coloured.
3.	Clear	Dark and satisfac.	Fairly tinged.	Not coloured.
4.	Coloured	Dark and satisfac.	Tinged deeply.	Fairly coloured.
5.	Slightly coloured	Half dark as 1.	Shaded.	Tinged.
6.	Not satisfactory	Half dark as 1.	Tinged.	Colourless.
7.	Coloured.	Fairly dark.	Shaded.	Tinged.
8.	Coloured fairly	¾ dark as No. 7.	Shaded.	Slightly tinged.
9.	Slightly tinged	Shaded.	Tinged.	Tinted.
10.	Milky	Dark.	Shaded.	Tinged.
11.	Milky	Shaded.	Tinted.	Slightly tinted.
12.	Fairly coloured	Dark and satisfac.	Shaded	Fairly coloured.

After this examination the samples were all shaken thoroughly, and the operation repeated at occasional intervals during a month, after which they were decanted carefully, and are herewith presented for examination. It will be observed that they are all clear and sightly (none having been filtered), except No. 7, the pulp extract, made with dilute cologne spirit. This sample is cloudy, and seems to contain considerable oily extractive.

Without taking up each sample in detail, it will be noted, from an external examination, that dilute spirit seems to be a satisfactory solvent. A careful comparison of the flavouring properties of the various samples will justify different conclusions, which appear later on. It had been the writer's intention to test carefully each sample for this quality, but a pressure of official duties prevented.

With the aid of a competent judge, samples Nos. 1, 3, 8 and 10 were repeatedly tested at a soda fountain, with the following results:—

No. 1 gave a fair flavour, but appeared to be a complex or mixed flavour as compared with Nos. 3 and 8.

No. 3 gave a very fine flavour, delicate but slightly woody.

No. 8 gave a very sweet, full vanilla flavour, and was extremely satisfactory.

No. 10 gave a very good flavour, and compared favourably with the average extracts of the market.

This sensible test I believe as expressive as any which could be employed. I confess my disappointment at the results, as I had for years been led to believe that all that was good in vanilla existed in the rind, and expected this test to prove it. Without following the examination further, I feel safe in asserting that while the rind contributes much body to an extract of vanilla, the delicacy of flavour lies in the pulp. This being true, it would be well to give greater heed to the solubility of its extractive matter. An examination of the pulp samples (Nos. 7, 8 and 9) evinces the fact that a menstruum, consisting of cologne spirits, 3 parts, water, 1 part, is the proper solvent.

This menstruum does not seem to be quite as well adapted to the rind as the dilute spirit, but the difference

is so slight as to be overcome by the greater value of the pulp flavour.

Whether the presence of sugar during maceration will increase the solvent power of the menstruum is a question I did not examine. Past experience in the laboratory would lead me to infer that it did not. It was formerly my custom to prepare an extract of vanilla by percolating the bean mixed with sugar, first, with spirit of full strength, afterward, with dilute spirit, and finally with sufficient water to make the product, when mixed, of dilute spirit strength. A mixing of these products always resulted in a very turbid extract, showing that the oily matter extracted by the spirit of full strength was not held in solution by the weaker menstruum. Better results, however, always resulted from such procedure than by maceration in dilute spirit, a point in favour of the theory that I have advanced, that a stronger spirit menstruum will give better results.

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

Jalap Resin and Jalapin.

BY JOHN M. MAISCH.

Active principles or characteristic constituents isolated from plants are usually designated by names derived either from the generic or specific botanical name of the plant; in some cases it has been found more convenient to start from the popular name by which the plant or its useful part is known, either in its native country, or in the country in which the investigation has been made. The same rule holds also for pharmacopœial and other medicinal drugs. If we apply this rule to the tuberous jalap root of Mexico we have, in the first place, the officinal names *Jalapa* and *Radix jalapæ*, or *Tubera jalapæ*, by which it has been admitted into the different pharmacopœias, and, on the other hand, quite a number of botanical names have been given to the plant, which is *Convolvulus officinalis*, Pelletan; *Conv. Jalapa*, Schiede (not Lin.); *Conv. Purga*, Wenderoth; *Ipomœa Purga*, Hayne; *Ipomœa Jalapa*, Nuttall (not Pursh); *Ipomœa Schiedeana*, Zuccarini; *Exogonium Purga*, Bentham; and *Exogonium Jalapa*, Baillon. The drug is known in Mexico as *purga*, also as *limoncillo* and *jalapa hembra*, or female jalap. The most characteristic name for the chief medicinal principle of this drug would evidently be *jalapin*, while *purgin* derived from the Mexican vernacular is obviously unsuitable. The former name has been used for the decolorized resin in older medical and pharmaceutical works, and is occasionally still met with for the so-called resinoid, which is simply the resin, more or less purified by washing with water, by repeated precipitation from alcohol, or by treatment of its alcoholic solution with animal charcoal. In chemistry, however, jalapin is a totally different, though an analogous compound.

Hume applied the name *jalapine* to a supposed alkaloid (*Med. and Phys. Journ.*, April, 1824, p. 346). I was unable to consult the original paper; but in *Buchner's Repertorium*, xxxvii., 204, it is stated that this principle was prepared by exhausting the root with concentrated acetic acid and precipitating the liquid with ammonia; the white substance was totally insoluble in ether, but dissolved readily in alcohol. Meylink (*B. Rep.*, xxxii., 446) could not obtain it in crystals. Subsequently Schweinsberg (*Magaz. f. Phar.*) thought the precipitate consisted of ammonio-magnesium phosphate with a little calcium phosphate; but Dulk ('Berl. Jahrb.,' 1825, xxvii.) showed it to be resin combined, as he supposed, with acetic acid; more properly speaking it is contaminated with acetic acid, some of which is persistently retained.

A communication from Van Mons, in 1826, who had endeavoured to decolorize resin of jalap by treating its alcoholic solution with gaseous chlorine, gave J. Pelletier (*Journ. de Phar.*, 1826, xii., 143) an opportunity to refer to his long-continued researches, undertaken for the purpose of isolating from jalap root a purgative principle distinct from the resin; these researches were unsuccessful, and the investigation of this important subject was stated by Pelletier to be connected with great difficulties.

About the same time T. W. C. Martius ascertained (*Kastner's Archiv.*, 1826, vi., 286), and soon afterwards L. A. Planche confirmed the observation (*Journ. de Phar.*, 1827, xiii., 167), that jalap resin may be completely decolorized by treatment with animal charcoal without depreciating its purgative properties; the latter obtained similar results also with two other hydragogue cathartic convolvulaceous resins, those of scammony, and of the herb of *Convolvulus Soldanella*, Lin. A modification of the process for decolorizing jalap resin was published by Martius in 1835 (*Buch. Rep.*, li, 367).

In 1831 A. Buchner and J. E. Herberger announced (*Buch. Rep.*, xxxvii., 203–212) the isolation of the supposed alkaloid jalapine by dissolving the brownish-yellow resin of jalap in alcohol, and precipitating an acid with lead acetate, after which water would precipitate subacetate of jalapine; by treatment with a little sulphuric acid, and subsequently with lead hydrate, the supposed alkaloid was obtained as a colourless transparent mass, pulverizable, totally insoluble in ether, soluble in alcohol, also in concentrated acetic acid, and less freely in strong mineral acids, usually with decomposition. The lead compound precipitated from the resin on being treated with H_2S yielded a brown mass, which was readily soluble in alkalies, also in ether and in acids. This acid and the jalapine were regarded as uniting to a subsalt, and thus constituting the natural resin.

While examining scammony, Clamor Marquart noticed in 1836 (*Archiv d. Phar.*, lvii, 236) that in certain solutions precipitates were obtained with tannin; likewise in certain solutions of jalap resin, and the presence of alkaloids was inferred in both products.

The elementary analysis of jalap resin made by Johnston in 1839 (*Philos. Trans.*, ii., 342) proved the presence of C, H and O, and the absence of nitrogen. A similar result had already been obtained by O. F. Goebel in 1821 (*Buch. Rep.*, xi., 84).

Cadet de Gassicourt first observed (*Journ. de Phar.*, 1817, iii.), that jalap resin may be separated by means of ether into two portions; one hard and resin-like, insoluble in ether, soluble in warm alkalies and from these solutions not precipitated, or merely very slightly so, on the addition of a mineral acid; the other portion soft, plaster-like, soluble in ether, and likewise in warm alkalies, but from the latter solution precipitated by acids in the same manner as the crude resin. It is the portion insoluble in ether which was subsequently called jalapine by Hume, Buchner and Herberger, though by them erroneously supposed to be an alkaloid.

The insolubility of the hard and soft portion of jalap resin in oil of turpentine appears to have been first noticed by Trommsdorff (*Neues Jour. d. Phar.*, 1833, xxv.), and was by him and others recommended as a convenient test for proving the absence of agaric resin, colophony and others, with which jalap resin was sometimes adulterated. Bley afterwards found (1839, *Buch. Rep.*, lxv., 374) that ordinary oil of turpentine would dissolve a little jalap resin, but the freshly rectified oil take up merely a trace of the latter.

During his investigations of the resins of jalap and orizaba root (1844, *Annalen*, li., 81), G. A. Kayser observed their solubility in strong sulphuric acid with the production of a red colour, and regarding this reaction as characteristic introduced the names *rhodeoretin* and *pararhodeoretin*, the former for the hard, white, in ether-insoluble resin of tuberous jalap, the latter for the similar, but in ether-soluble, resin of fusiform jalap. Kayser proved also that the resins, which have a neutral reaction on litmus, on being dissolved in warm alkalies, are converted into acids soluble in water. The ether-soluble

resin of tuberous jalap has, however, an acid reaction and retains the peculiar odour and acrid taste of jalap. B. Sandrock (1850, *Arch. d. Phar.*, cxiv., 160) obtained it of a yellow colour, soft, tough, not becoming hard and brittle on drying, precipitated by lead acetate, soluble in alkalies and after prolonged boiling of this solution converted into a peculiar acid somewhat soluble in water. He named this soft resin "gamma-resin," and regarded the ether-insoluble resin as consisting of "alpha-" and "beta-resin," which, however, were soon shown to be not materially distinct. Pereira (*Mat. Med.*, Amer. edit., 1854, p. 520) retained for this resin the name jalapin, and called jalapic acid the portion soluble in ether.

F. Holl (1846, *Arch. d. Phar.*, xcviii., 45) and others had shown that the colour reaction observed by Kayser with sulphuric acid is by no means characteristic for the jalap resins, but in his first researches Wm. Mayer retained (1852, *Annalen*, lxxxii., 121) the name rhodeoretin, until after having extended them to the resin of fusiform jalap (1856, *Annalen*, xcv., 129), he very unfortunately adopted for the pure resin of the latter the name *jalapin*, while the ether-insoluble resin of tuberous jalap, which is the most important active principle of this drug, was designated *convolvulin*. The ether-soluble resin accompanying the latter was not investigated by Mayer. The pure resin of scammony, at first called *scammonin*, was through the researches of F. Keller and H. Spirgatis (1857–1860, *Annalen*, civ., 63; cix., 209; cxvi., 289; *Buch. N. Rep.*, vii., 9, 511) shown to be identical with the jalapin of the orizaba root.

It is very difficult, if not impossible, to ascertain now by whom the name jalapin was first applied to the soft resin of true jalap, with which Mayer's jalapin has nothing in common except the solubility in ether; but it is thus designated in several English, French and German works. The confusion is thereby increased, for the name jalapin, which was originally given to the ether-insoluble resin of true jalap root, is now occasionally applied to the more or less decolorized natural resin of jalap, the greater portion of which is insoluble in ether; 2, to the ether-soluble portion of this resin, soft at ordinary temperature, readily fusible and not becoming brittle even after prolonged exposure to a heat of 100° C.; and, 3, to the pure white resin of Orizaba jalap and of scammony, brittle at ordinary temperature, and melting at about 150° C.

In answer to the question as to what is sold commercially as jalapin, attention may be drawn to a paper recently published in *Phar. Jour. and Trans.*, Feb. 12, 1887, pp. 650–652, in which eight samples were examined, one of which was completely soluble in ether, and consisted either of Mayer's jalapin or of tampicin, the resin of Tampico jalap, which, however, has a lower fusing point than the former, namely about 130° C. The other samples, seven in number, were evidently resins of true jalap and yielded between 3·5 and 7·3 per cent. of ether-soluble resin, which, though stiff and tenacious, and incapable of being rendered quite hard, was considered to be identical with jalapin; its solubility in warm ammonia was not ascertained.

"Jalapin" does not appear to be often prescribed in the United States; still it was not difficult to procure under this name two entirely distinct articles, one of which, being of German manufacture, answered to the characters of Mayer's jalapin in being soluble in ether, while the other yielded to ether 3·3 per cent. of a soft brown resin, which had an acid reaction and was soluble in warm potassa solution and reprecipitated by excess of acid; warmed with ammonia a milky emulsion-like mixture was obtained, but not a clear solution. This soft resin was dissolved in absolute alcohol, for several days treated with animal charcoal, and the filtrate evaporated, when a soft brownish-yellow mass was left, neutral in reaction, leaving no residue when ignited, and giving with warm ammonia a milky mixture. A second and third treatment with somewhat weaker alcohol, and excess of animal charcoal, diminished the quantity of this soft mass very considerably, but without materially altering its characters. After a fourth treatment only a minute quantity of it was left, the properties being unaltered. It follows from these results that this ether-soluble portion is entirely distinct from Mayer's jalapin; in fact, its resinous nature appears to be quite doubtful, and it seems to me more nearly related to the fats and waxes, and to be absorbed from its solution by a large quantity of animal charcoal.

In 1854 Professor L. A. Buchner (*N. Rep.*, iii., 22; *Amer. Journ. Pharm.*, 1854, p. 446) reported that the ether-soluble portion of jalap resin behaves like rhodeoretin (or convolvulin) with alkalies; for if resin of jalap be dissolved in warm potassa solution, and the liquid supersaturated with an acid, either no change takes place or only an opalescence without real precipitation, according to whether the resin had been decolorized by animal charcoal or not.

A somewhat analogous observation has more recently been published by Professor Flückiger (*Pharm. Zeitung*, 1883, p. 211), according to which resin of jalap decolorized by animal charcoal is dissolved by warm ammonia water and not reprecipitated by acids. The explanation of this behaviour, it appears to me, is to be found in the removal, by the charcoal, not only of colouring matter, but also of that substance in jalap resin which is soluble in ether.

The second sample of jalapin, to which I referred above, did not essentially differ from the pharmacopœial resin of jalap, except that it was lighter in colour, and was sold at about three times the price of the latter.

Now, considering the confusion in regard to the term "jalapin," it appears to be extremely desirable to abandon it altogether, in pharmacy and in chemistry, and to likewise abandon the term "convolvulin" as not sufficiently characteristic. The ether-insoluble resin of true jalap may be very appropriately called *jalapurgin*, which indicates the origin of the principle as well as its medical properties; the ether-soluble portion, however, is (at least in its crude state) a mixture, and does not deserve a distinctive name until fully investigated. On the other hand, the ether-soluble resin of fusiform jalap, to denote its origin, should be called *orizabin*, which, on account of its identity with the resin of scammony, would be synonymous with scammonin.

It may be stated yet that my present experiments agree very well with those made in previous years, when I ascertained that the ether-soluble resin of jalap, after being treated with animal charcoal, is not white, but brownish-yellow; is not brittle, but sticky, and dissolves in warm potassa to a slightly opalescent solution, which becomes milky on the addition of an acid. Still it is possible that the results may vary to a certain extent, since the amount of ether-soluble matter has been found to vary from between 3 and 4 per cent. to about 12 per cent. of the total pharmacopœial resin.

Whether the introduction into medicine or into the pharmacopœia of a pure "jalapurgin" is desirable, appears to be doubtful; for according to the investigations of Dr. W. Bernatzik (*Zeitschr. d. k. k. Gesellsch. d. Aerzte in Wien*, 1862, 1863; *Buch. N. Rep.*, 1864, xii., 451–467), about equal purgative effects are obtained with 0·17 gram of pharmacopœial resin of jalap, 0 216 gram pure convolvulin, and 0·50 gram of soft jalap resin (the ether-soluble part).

Two samples of jalap resin recently examined by me yielded respectively, 3·01 and 4·8 per cent. to ether; in neither case was the exhaustion complete, but very nearly so. A good plan for treating jalap resin with ether is that followed by E. White (*loc. cit.*), mixing with about three times its bulk of sand, and percolating with ether; the operation is tedious, the last portions of the substance being with difficulty removed. Another method is solution of the resin in a small quantity of warm alcohol and precipitation by ether gradually added;

a considerable quantity of the latter is required for precipitating the last portions of the ether-insoluble resin, and it will be found advantageous to evaporate the ether solution, re-dissolve the residue in a little alcohol, precipitating again by ether, and to repeat this operation several times.

Should a lighter coloured resin of jalap than the present one be desirable, and there are good reasons for the admission of such a product, the process originally suggested by L. A. Planche (*Bull. de Phar.*, 1814, vi., 26), and variously modified by later writers, would probably be preferable to the pharmacopœial process. Without entering into details, the following references to observations on this subject may be of interest:—Ilisch (*N. J.*, iii., 2; *Buch. Rep.*, 1824, xviii., 210), Thiele (*B. Rep.*, 1826, xxiii., 306), Gummi (*Ibid.*, 1827, xxvi., 106), Wolf (*Ibid.*, 1828, xxix., 372), Torosiewitz (*Ibid.*, p. 384), Raab (*Ibid.*, 1832, xlii., 143), Buchner (*Ibid.*, 1834, xlix., 252), Martius (*Ibid.*, 1835, li., 363, 367), Geiseler (*Arch. Phar.*, 1836, lxiii., 221), Mouchon (*Jour. Chim. méd.*, 1837, p. 382), Nativelle (*Journ. Pharm. Chem.*, 1842, [3], i., 228), and others. It may be briefly stated that in these processes the jalap-root, either unbroken, or in small pieces, or in powder, is first exhausted by water, either cold or hot; the drug is then drained, and while still wet, or after having been previously dried, exhausted with either cold or warm alcohol; the tincture is concentrated and the residue washed with water. In some cases the material exhausted by water is directed to be mixed with animal charcoal and then treated with alcohol. Emile Mouchon avoided the treatment of the root with water, but mixed the powder with one and a half times its weight of animal charcoal, displaced this mixture with alcohol, and precipitated the concentrated tincture with water.

It will be observed that numerous processes may be devised for obtaining jalap resin white, or nearly white, or at least much lighter in colour than the present pharmacopœial resina jalapæ.

Parliamentary and Law Proceedings.

Poisoning by Vermin Killer.

On Saturday last, Mr. C. C. Lewis, the Coroner for Essex, held an inquest at the Crooked Billet Tavern, Walthamstow, on the body of the daughter of an agricultural labourer, named Charlotte Greenwood, aged 17, whose death was caused under the following circumstances. The deceased had been discharged from her situation three weeks previously, but told her mother that her mistress was gone out for a trip, and that she had a month's holiday. On the previous Thursday afternoon the girl went out, as she told her mother, for a walk, and on her return went directly to bed. Her mother went up to her room and taxed her with idleness, to which she replied, "Don't bother me, as I have such a splitting headache." Ten minutes afterwards her mother heard shrieks, and on returning to the room found her daughter shrieking, pale, and very convulsive. She accused her of taking something, which she at first strongly denied, but afterwards admitted that she had taken two packets of Battle's vermin destroying powder. Mr. Bond, a local surgeon, promptly attended, but the girl died two hours subsequently.

Michael Pierce, assistant to Mr. Price, chemist, of Walthamstow, said the girl bought the powders of him on Wednesday afternoon; she appeared cool and collected, and signed the poison book (produced) in the name of "L. Penn."

The Coroner: As these powders are not scheduled in the register of poisonous drugs, why did you require her to sign the book, the Act does not require it?

Witness: I acted according to my instructions.

The Jury ultimately returned a verdict of "Suicide whilst labouring under temporary insanity," and the Foreman added, "We think, sir, that something ought to be done, so that people cannot get this powder so easily."

The Coroner: I quite agree with you. Recently I have held not less than seven or eight inquests on persons who have destroyed themselves with this powder. There is no precaution exercised with regard to its sale, any person can obtain it by simply asking for it, whilst drugs less poisonous in their operation are hedged round with various kinds of precautionary measures. I will remit your recommendation to the medical authorities above and hope it may prove the means of awaking the public mind to the dangerous nature of the powders, and may cause prohibitory legislative measures to ensue.

Reviews.

Atlas Manuel de l'Histologie des Drogues Simples. Par J. Godfrin, Professeur à l'école supérieure de Pharmacie de Nancy, et Ch. Noël, Préparateur à la même école. Paris: Librairie F. Savy.

Since the publication, in 1865, of the 'Anatomischer Atlas zur Pharmaceutischen Waarenkunde,' by Dr. Otto Berg, the work done in illustration of vegetable histology, in so far as it relates to drugs, for the most part lies scattered in various publications not readily available to the student, as for instance, those by Dr. Jos. Müller, of American drugs which have acquired some reputation both in the United States and also in this country as valuable remedial agents. In the early part of this year, however, that careful worker in this field, Dr. A. E. Vogl, Professor of Pharmacology and Pharmacognosy in the Vienna University, issued an 'Anatomischer Atlas zur Pharmakognosie,' containing some of his more recent investigations whilst engaged with Schneider on the several editions of their commentary on the Austrian Pharmacopœia, and he has illustrated many subjects not previously treated in the 'Atlas' of Berg. Many of these, in enlarged drawings, were used by him as wall illustrations for his class at the University.

The far more copious 'Hand Atlas' of Godfrin and Noël, now before us, illustrating the histology of simple drugs, is modestly described in the preface as an aid to students enabling them to follow with advantage the histological descriptions given in the courses of lectures on materia medica delivered by the authors at the Superior School of Pharmacy at Nancy.

It is refreshing to find that in this school of pharmacy the old and comprehensive title of materia medica has not given place to the more modern name and limited area of this subject comprised in the term pharmacognosy.

One great aim of the authors, and a very creditable one, appears to have been accuracy of detail, and they have called in the aid of photography to assist them in carrying out this laudable intention, but almost as a consequence in some instances the sacrifice of artistic merit appears to be involved.

Whilst we congratulate students in this department of science on so much valuable material issuing at the same time from both the French and German press, it may assist us in estimating the value of this 'Hand Atlas' by placing it side by side with the 'Atlas' of Vogl, and may aid us in arriving at a clear conception of the relative advantages of the two publications.

In comparing the treatment of the same subject in the two atlases it will be found that in many cases the illustrations of the same drug are from different points of view, as, for instance, the one may give a transverse section, while the other illustrates the same subject by a longitudinal one, thus increasing the means of identification at the disposal of the student.

The French work contains many drugs not treated in the German, and not unfrequently one author gives a section of the leaf, whilst the other describes the root; this variation may be expected so long as the Pharmacopœias of the different countries differ in the parts o the plant employed in medicine.

There is one material advantage in the 'Atlas' of Vogl. Whilst he gives a section of the drug showing the different tissues and their relation to each other, he gives also, more highly magnified—and this is a special feature of his work—the elementary cells isolated of which those tissues are composed, characteristic cells for the determination of the true drug and for the detection of the adulterant. This is strikingly exemplified in the case of powdered cubebs, in fol. uvæ ursi, with many others, and is of great value as a guide in the examination of a drug in a powdered form, just as it is often received into stock by the pharmacist. On the other hand, the French work takes in some important modern drugs not found in the German, as, for instance, the leaf of the coca plant and that of the *Eucalyptus globulus*, the bark of *Cascara sagrada*, the root of podophyllin, also that much histologically contested root, *Pareira brava*, with many others of equal value and importance.

The 'Hand Atlas' is a valuable addition to our histological library, and we may congratulate the Professor and his coadjutor in having produced a work which entitles them to the gratitude of every student in materia medica, and one that will most certainly more than satisfy their modest ambition of being amply recompensed if they have contributed in however feeble a manner to facilitate the study of vegetable histology in its application to materia medica.

At the same time it must not be forgotten that, however amply the student may be provided with illustrations, a thorough knowledge of practical vegetable histology can only be gained by systematic and sustained laboratory work, combining chemical with microscopical investigation.

A Text-Book of Inorganic Chemistry, by Professor Victor von Richter, University of Breslau. Authorized Translation by Edgar F. Smith, Professor of Chemistry in Wittenberg College, Springfield, Ohio. From the fourth German edition.*

The most noteworthy feature of this work, and one in which it differs from most of its fellows, is the arrangement of the elements into their natural groups according to the now familiar periodic system of Mendelejeff and Lothar Meyer. By means of this method of grouping them, the analogies between the elements of similar groups are brought into much greater prominence, while at the same time the gradual transitions in character and properties from the extreme types through their intermediate stages is made very plain. In this way the physical characters, such as density, volatility, fusibility, and also the chemical behaviour and quantivalence of each element is shown to be regulated by its atomic weight and consequent position in the periodic system. Being treated of in homologous groups too, the similarity of their relations to those occurring in homologous groups of carbon compounds is made very striking and apparent. There is perhaps on the other hand, the disadvantage that points of dissimilarity and contradictory behaviour are to some extent lost sight of in the desire to show their correspondence with each other, and the groupings made use of for analytical purposes are completely thrown into the background, but there is no doubt of the advantage of this mode of treatment for giving a good comprehensive view of the principles of chemistry, and it has been carefully and thoroughly carried out by the author.

Attention is also drawn at every opportunity to the principles of thermo-chemistry, and the manner in which the affinities of substances for each other correspond to their heat of formation; the theory is tested and practically applied on every possible occasion, and a table of the heat of formation of a great number of the more important chemical compounds (according to Thomsen) is appended.

The plan which has been followed of first drawing attention to certain facts, and then from these observed phenomena deducing the theories and laws which are usually simply stated as being such, is very much to be commended. Too many students of chemistry are content to take them on trust, and although they could readily state such and such a law, or define a particular theory, would be puzzled to say on what grounds it rests, and what are the arguments for and against it, or how it has been arrived at; this would not be the case after reading the book before us.

The atomic theory, for instance, is developed step by step from the first observed facts of equivalent weights of the elements in all chemical compounds, until all our conceptions of molecular structure, atomic volume, quantivalence, etc., are arrived at. In connection with this part of the subject, both the views generally adopted as to the atomicity or valence of the elements are explained, viz., that the valence of the elementary atoms is a constant property, and that apparent exceptions are to be explained by such formulæ as Cl – O – O – O – Cl, or by the assumption of molecular combinations as ICl, Cl_2, and on the other hand, that valence is not a constant property but a function liable to variation; the preference is given to this latter view which has the balance of evidence in its favour, but both sides of the question are fairly discussed.

Although this volume is devoted to inorganic chemistry we find some compounds here described which are usually treated of in the organic section, such as ethane, ethylene and acetylene. We recognize the difficulty of drawing a line between organic and inorganic substances, and in fact in this case as in others, such as botany and zoology, there is no dividing line in nature, but a distinction is drawn by ourselves for the sake of convenience. The author says as much in the chapter on carbon, remarking that the derivatives of this element should come in the general system of chemistry, but they are so numerous that in practice it is better to treat them apart.

The oxygen and sulphur compounds of carbon are of course described, and we notice that the author does not regard CO_2 as a poison in the true sense of the word, its poisonous effects being due to its retarding the separation of the same gas from the lungs.

Another statement which varies from the generally received opinion is that (on the authority of Beketoff) metallic potassium cannot decompose KOH with production of K_2O and H, but that the converse reaction takes place, K_2O and H giving KOH and K. We also find the formula for calamine given as Zn_2SiO_4, which might lead to some misunderstanding, as the term is only in general use in this country for the native carbonate of zinc, the siliceous calamine being comparatively unknown under that name.

The illustrations are plentiful and good, and there are very few of the clerical or typographical errors which appear too frequently in similar works. The book is one which might be read with advantage by those who have previously studied the subject from other sources, for the relations brought into prominence differ from those in most text-books.

The volume on 'Organic Chemistry,' by the same author, is also published by Messrs. Trübner and Co.; this was recently reviewed in this Journal.

* Philadelphia: Blakiston, Son and Co. London: Trübner and Co. 1885.

ANSWERS TO CORRESPONDENTS.

J. H. W.—Probably the "seed" you refer to is what is known as the ginger-beer plant. See *Gardeners' Chronicle*, April 26, p. 542. You should send up a specimen.

Alpha.—*Galinsoga parviflora*, *Erysimum cheiranthoides*, *Amaranthus retroflexus*. The fourth specimen is possibly a salvia; send a good specimen of it in flower.

Herbarium.—You should address your inquiry to Professor Bentley.

Botanist.—*Euphorbia exigua*.

Communications, Letters, etc., have been received from Messrs. F. B. Benger, W. A. H. Naylor, E. S. Peck, E. W. Farrow.

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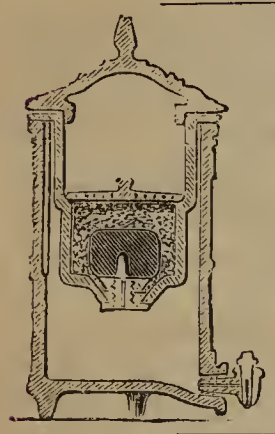

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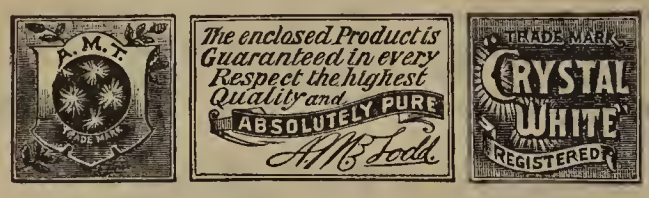

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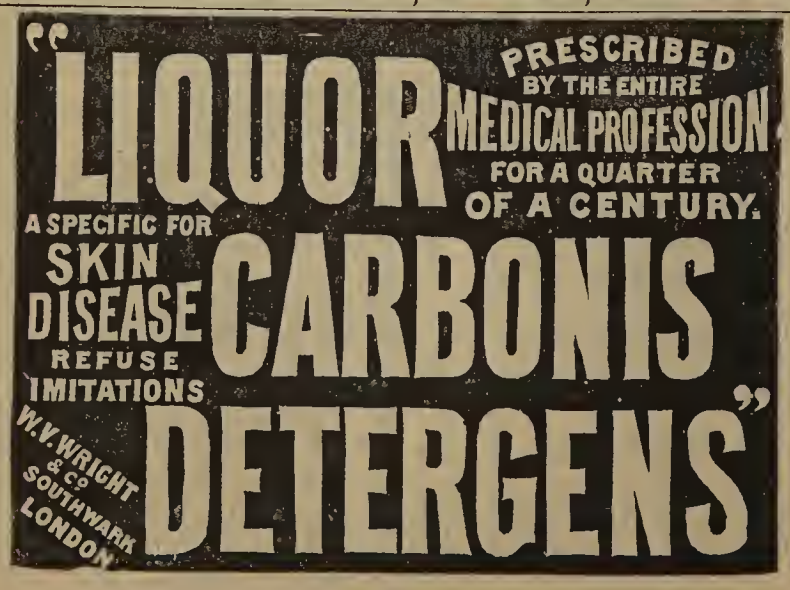

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The WINTER SESSION of 1887-88 will commence on OCTOBER 1, when an Introductory Address will be delivered by R. W. REID, Esq., F.R.C.S., at 3 p.m.

Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

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Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

R. W. REID, Vice-Dean.

The London Hospital and Medical

COLLEGE, Mile End, E.

The SESSION 1887-88 will commence on Saturday, October 1st, 1887. The New Buildings, which were opened by T.R.H. The Prince and Princess of Wales, on May 21st, afford more than double the accommodation which was provided formerly.

FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All Resident and other Hospital Appointments are free, and the holders of all the Resident Appointments are provided with rooms and board entirely free of expense. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, one Accoucheurship, and one Receiving-room Officer; Dressers and Maternity Pupils also reside in the Hospital. Special Classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London, and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England, are held throughout the year. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, Metropolitan District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

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Mr. J. W. Lang, Southport

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Mr. H. Aspinall, Liverpool	Mr. T. Clough, Liverpool
„ W. Bentley, Lancaster	„ C. E. Hanslow, Woodford
„ T. Birkett, Workingt'n	„ E. Jones, Portmadoc
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„ T. W. Carr, Knaresbro'	„ B. Phillips, St. Clears
„ G. M. Gass, Whitehaven	„ A. Stephen, Liverpool

Preliminary.

Mr. J. H. Griffiths, Little Brighton	Mr. J. H. Marples, Birk'h'd
„ A. A. Jones, Liverpool	„ H. E. Sawden, Liverp'l
	„ W. H. Warhurst, Liverpl

Apothecaries' Hall—Mr. J. W. Whitely, Gainsborough.

Jacob Bell Scholarship—Mr. W. A. Salter, Birkenhead (one of the Bell scholars for next session), is a member of the Chemistry and Pharmacy class.

NOTE.—*All that have been sent in for (a) the Major, (b) the Preliminary, and (c) the Apothecaries Hall during this session have passed.*

The next session will commence on Monday, Sept. 5, 1887. Those desirous of joining the October or December Classes should enter at once. New Syllabus, with full particulars of Classes, Fees, &c., sent free on application.

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A collection of the MANY DIFFERENT NAMES by which Drugs and their preparations are known both to the Public and to the Profession. Being arranged in the form of a Dictionary it affords a ready means of getting at the Official or Officinal name of the Drug required. Invaluable to Chemists, their Assistants and Apprentices. Price One Shilling, by Postal Order, to WHITE, 4, Seymour St., Bath.

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Advertisements under this heading are charged as follows—Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

MINOR.—September 1st. London. With short time for study. Age 22. Good references. ANDREW, 20, High Rd., Kilburn, N.W.

AS JUNIOR. Middle of September. 6 years' experience. Age 21. Good references. L., Medical Hall, Aberdovey, N. Wales.

AS ASSISTANT or DISPENSER. 9 years' London and country experience. Minor. Age 25. Good references. Disengaged. ALPHA, 47, Market St., Farnworth, near Bolton.

AS MANAGER. London or suburbs preferred. Age 28. Minor qualification. Y. Z., 6, Farringdon Villas, Whitestyle Rd., South Ealing.

BY qualified man. Age 23. 5ft. 11in. 7 years' London experience. Married. To Manage Branch or otherwise. MINOR, 3, Marsham St., Westminster.

WHOLESALE or Retail. As ASSISTANT. 16 years' experience. Age 34. First-class references. J. A. C., 22, Queen St., Horncastle.

LOCUM TENENS or to Manage Branch. Experienced Dispenser and Prescriber. Qualified. L. F., Mrs. Rickson, 7, Haddon Rd., Sutton.

AS ASSISTANT or MANAGER. Age 25. Good references. Disengaged. X., Knox, 5, Fenchurch St., E.C.

GOOD DISPENSER. Excellent references. Age 22. Height 5ft. 8in. South Coast preferred. J. R., 34, Wiltshire Rd., Brixton, S.W.

AS DRUGGISTS' PORTER or WAREHOUSEMAN. Good knowledge of the trade. 5 years in last situation. Apply PORTER, 18, Long Causeway, Peterborough.

ENGAGEMENTS WANTED.

PART-TIME. Good experience and testimonials. In or out-door. STUDENT, 36, Sydney Rd., Stockwell, S.W.

AS MANAGER or out-door ASSISTANT. Age 31. 16 years' experience. 5 as Manager. E. W., 26, Sydenham St., Whitstable.

IN London. Out-door. 5 years' London experience in Retail and Dispensing. Good reference. Age 21. Passed Prelim. H., 57, New Kent Rd., S.E.

TEMPORARY duty. Used to good class (full price) business. Registered. TAYLOR, 30, Devonport Rd., Shepherd's Bush, W.

LOCUM TENENS. Disengaged 20th. Extract Teeth. D., 52, Upper Baker St., N.W.

JUNIOR. London. 22. Height 5ft. 8in. M., 86, North St., Edgware Rd.

IN good class business. 3½ years' experience. 19. MARSTON, Chemist, E. Dulwich.

JUNIOR. Age 24. 7 years' experience. References. A. L., 6, Mount St., Shrewsbury.

JUNIOR. 7½ years' experience. Mixed business. Satisfactory references. A. G., Bidboro', Tunbridge Wells.

ASSISTANT. Wholesale or Retail. Good references. Age 24½. CHEMICUS, Winthorpe, Newark.

AS TOWN TRAVELLER. Good connection. SPES, 191, Lancaster Rd., W.

OUT-DOOR ASSISTANT. Town or country. Age 30. Good references. ALPHA, 48, Bellefield Rd., Brixton, S.W.

AS ASSISTANT. Age 24. Height 5ft. 10in. Experienced. Minor and Apothecaries' Hall qualifications. C. MATTHEWS, Bishop Wilton, York.

AS ASSISTANT. Age 22. Minor qualification. Good references. Yorkshire or Lancashire preferred. H. WILLIAMSON, 78, High St., Dorking.

AS JUNIOR. 4 years' experience. Height 5ft. 10in. Age 19. Good reference. CHEMICUS, 7, Albion Pl., Maidstone.

SENIOR, MANAGER or otherwise. Over 12 years good and varied experience. Qualified. Successful in Prescribing and Tooth Extracting. Married. No family. Permanency. Highest references. LLEWELLYN WILLIAMS, North St., Bishop's Stortford.

ASSISTANT or Branch MANAGER. Age 30. Single. Height 5ft. 7in. Abstainer. Not passed Minor. Disengaged. Good references. Good Prescriber and Tooth Extractor. K., 32, King Henry's Walk, Islington, London.

AS JUNIOR. Good references. Able to Dispense, Prescribe and Extract Teeth. PHILLIPS, care of Mr. Tigar, Chemist, Freemantle, Southampton.

AS ASSISTANT. Age 29. Country preferred. Moderate salary. Good experience. Qualified. Disengaged. MINOR, 28. Salisbury Rd., West Kilburn, N.W.

LONDON. End of September. JUNIOR in good class Retail and Dispensing, to attend two evening classes weekly. Particulars, apply KIRKBY, 80, Westgate, Grantham.

ASSISTANT or Dispenser, temporary or permanency. 5 years' good experience and references. Age 23. CHEMICUS, 245, Goswell Rd.

LOCUM TENENS, during absence, &c. Good address, long experience. Qualified, highest references. MEDICUS, 23, Stockbridge Ter., Victoria St., S.W.

JUNIOR or IMPROVER. Aged 20. Height 5ft. 9in. 3 years' experience, good references, abstainer. WALTER SCOTT, Pitsford, Northampton.

ENGAGEMENTS WANTED.

WHOLESALE or Retail. Age 26. 10 years' experience. Minor. Reliable references. VERNON, 156, Marylebone Rd., London.

SENIOR or MANAGER. Out-door. Age 36. Height 5ft. 11in. Retail and Wholesale experience. Highest references. Can introduce specialities. M. S., The Trees, Stafford.

AS JUNIOR in London. Out-door preferred. Age 22. 7 years' good experience. Disengaged September 7th. WILLIAMS, Twinberrow & Son, Wigmore St., W.

AS JUNIOR or IMPROVER. Age 20. 4 years' experience. A. H., Rose Hill, Ash-next-Sandwich, Kent.

OUT-DOOR. Ætat 24. Varied experience. VITÆ, 224, High St., Camden Town.

IMMEDIATELY, by a Qualified Junior. X., 142, High St., Guildford.

TEMPORARY. Open to engagement after August 29. A. BLACKBURN, Pharmacist, Eccles, Manchester.

AS DISPENSER. Part-time. Apothecaries' Hall qualification. 74, City Rd., Bristol.

JUNIOR. 7 years' experience. Age 22. In or out-door. A. A., Salisbury Rd., Bournemouth.

ASSISTANT. London. Age 27. Good references. A., Canfield House, Fitzjohn's Parade, N.W.

ASSISTANT. Age 21. 5 years' apprentice, and 9 months assistant in good class mixed business. Every investigation as to character, abilities, &c., solicited. Permanency. For reference, apply Mr. LAVERACK, Malton, York. Further particulars from F. W. Marton.

ASSISTANT. Branch Manager, &c. Prescribe. Extract Teeth. Height 5ft. 6in. Age 25. D., Mr. R. FEAVER CLARKE, Chemist, Gravesend.

ASSISTANT in good business house. Good reference and experience. Age 27. A. FUGLER, Probus, Cornwall.

ASSISTANT, or Branch MANAGE. Out-door. Age 25. Prescriber. Tooth Extractor. MEDICUS, 149, Higher Cambridge St., Manchester.

ASSISTANT. Aged 40. Well up in Agricultural Pharmacy. W. F., 78, High St., Dorking.

LOCUM. Hospital work or Counter trade. Any distance. HARDEMAN, 24, Delhi St., N.

MANAGER of branch. 25. Married. Good Prescriber and Teeth Extractor. Abstainer. References. DIMMICK, New England St., St. Albans, Herts.

AS MANAGER, by a thoroughly competent man. 17 years' town and country experience. Good counterman and Prescriber. Single. Qualified. W., 29, Percy St., Bedford Sq., London, W.

MANAGER of Branch or Dispenser to Surgeon. Home countries preferred. Age 32. Married. Minor qualifications and Registered Dentist. DENTIST, 96, Glenthorne Rd., New Southgate.

A PHARMACEUTICAL and Analytical Chemist, also an F.C.S., would like to hear of an engagement, out-door, in a first-class business, where his Analytical work would also be an advantage to him. London preferred. Highest references. F. W. FREEMAN, St. Albans.

ASSISTANTS WANTED.

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A JUNIOR ASSISTANT. Apply to TOMLINSON & BROMLEY, Lincoln.

ASSISTANTS WANTED.

PILL COATER. An experienced Hand wanted for a permanency. None need apply who cannot turn out a good quantity of first-class work, and produce satisfactory testimonials. Address, PILLS, care Meggeson & Co., Miles Lane, London, E.C.

WHOLESALE. An experienced DRYMAN wanted. Address, with usual particulars, stating age and salary required, to ZEMA, care of G. Street & Co., Cornhill, London.

APPRENTICE.—South-west of France. A vacancy occurs in an old-established Family and Dispensing PHARMACY, owned and conducted by an Englishman, possesssing the Diplomas of both countries. Premium required. C. C. SMITH, Chemist, Pharmacien de 1re Classe, Pau, France.

A QUALIFIED and experienced ASSISTANT as Manager in a city business, outdoor. Address, C. BEDFORD, 6, St. Swithin's Lane, Mansion House, E.C.

A THOROUGHLY competent ASSISTANT, in-doors, for Retail counter, who has had experience in a first-class provincial house. Good address and recommendation indispensable. State age, salary required, references, with photo, to CHAVE & JACKSON, Pharmaceutical Chemists, Hereford.

ABOUT 25th. A competent steady ASSISTANT to take charge for a fortnight. Apply, by letter, to ALPHA, 3, Beaumont Villas, North Finchley.

IN about a fortnight, for a permanency, a reliable (qualified) ASSISTANT, with first-class experience. Apply, by letter, S. A., 115, Haverstock Hill, N.W.

A QUALIFIED ASSISTANT, about 24. Apply personally, DECASTRO & Co., 32, St. George's Pl, Knightsbridge.

FOR September 1st. Two qualified ASSISTANTS, age about 25, for West-end business. Apply, by letter, W., care of Gosden & Co., 17, Tavistock St., Covent Garden, W.C.

IMMEDIATELY.—Good JUNIOR, accustomed to a good class Dispensing and Retail business. State full particulars to A. CARTWRIGHT, 25, Bell St., Henley-on-Thames.

EARLY in September.—A competent ASSISTANT, about 23, accustomed to good Retail and Dispensing. Qualified. Two Assistants and Apprentice kept. Apply, personally, or if by letter, enclose photo (to be returned), stating age, height, references, salary required (in-doors), and qualification, to FRANCIS CARTER, Pharmacist, High St., Carshalton, Surrey.

A COMPETENT JUNIOR for general Retail. Minor qualification desirable. Hours 8 to 7.30 p.m. No Sunday duty. State age, experience, references, and salary required, enclosing photo, if convenient. READE BROS. & Co., Wolverhampton.

A COMPETENT ASSISTANT. Not under 23. Must be accurate Dispenser, and of good address. State salary, references, &c., and enclose carte. H. PRYER, 12, Wellington St., Teignmouth.

AN ASSISTANT for good class business. One with London experience preferred. Send photo. and full particulars to STATIM, Messrs. Hearon & Co., 5, Coleman St., London, E.C.

COUNTERMAN (out-door) for a brisk ready money Retail, where 4 are kept. Salary to commence at £80 per ann. Enclose photo and state age, height, and experience to E. J. KITSON, 1, Broad St., Worcester.

JUNIOR ASSISTANT wanted. Able to Dispense and Prescribe. Address, with carte de visite, salary required, references, and all particulars, to W. E. STOKES, 22, High St., Brompton, Chatham.

ASSISTANTS WANTED.

JUNIOR, who is fairly up in Retail and Dispensing, and can assist in Post-office. Apply, stating age, height, experience, reference, salary required, &c., and enclose photo (if convenient) to CHEMIST, 50, Queen's Rd., Brighton.

ASSISTANT (Junior.) Apply, personally, at 143, Hackney Rd.

IN-DOORS.—A JUNIOR, of good address in a Dispensing and Retail business. Must be a good Dispenser, and one whose character will bear strictest investigation. One only kept. Apply, E., Hearon, Squire & Francis, 5, Coleman St., London.

WHOLESALE. — ASSISTANT (Junior) for Dry Counter. Must have had previous experience. Apply, by letter, with particulars of salary, reference, &c., to U. C., care of Davies & Co., 46, St. Mary Axe, E.C.

ASSISTANT, good Dispenser, in middle-class Family business. Suburb of Liverpool. Knowledge of Telegraphy and Postal work necessary so as to occasionally assist in same. POSTAL, care of Evans, Sons & Co., Liverpool.

APPRENTICE or IMPROVER required for light Retail and Prescribing business. Time for reading. State full particulars and salary required to CHEMIST, 76, Lozells Rd., Birmingham.

BY September 1st. A Junior ASSISTANT. Not under 20. For a brisk Retail at the seaside. Time for study. No Sunday duty. Apply personally or by letter, enclosing photo., and giving age, height, salary and references to W. R. BAKER, Chemist, Gipsy Hill, S.E.

A GOOD JUNIOR for a high class Dispensing business, where two assistants are employed. He must have passed Minor examination, be a reliable Dispenser, and of good address. Personal application or full particulars (with carte), stating salary required, to WATTS & Co., 114, Church Rd., West Brighton.

DISPENSER and BOOK-KEEPER wanted. For three weeks, commencing September 6th. Please state age, salary required. Out-door, &c. E. T. SAGE, 14, Malvern St., Stapenhill, Burton-on-Trent.

IMMEDIATELY.—A good JUNIOR, in-door, for comfortable situation and permanency. Apply, stating age, experience, reference, salary, when disengaged, enclosing photo, to G. OLDERSHAW, A.P.S., 137 and 213, County Road, Walton, Liverpool.

ASSISTANT, married, with Minor qualification preferred, to reside on the premises (proprietor living away). Good dwelling house, arrangements to be made to board two Apprentices. One accustomed to first-class Retail and Dispensing. Good salesman, and to assist in book-keeping. The strictest investigation will be made as to general character and ability. Good discipline indispensable. Applicants will please state age, height, and fullest details, with photograph, or apply, personally, to Mr. REEVE, New Street, Birmingham.

AN ASSISTANT, about 22 years of age, accustomed to good class business, and must be a reliable Dispenser. Apply, stating age, height, salary required, enclosing photo, to JOHN EKINS, Chemist, 97, High St., Bedford.

PERMANENCY.—An ASSISTANT, about 24. Apply personally if possible, THOS. MACCRINDLE, High Rd., Tottenham.

A YOUNG Qualified ASSISTANT or JUNIOR (time to study given) for a Branch Homœopathic business. No previous knowledge of Homœopathy necessary. A good opening to a possible purchaser. Reside on the premises. Must be quick, intelligent, and have best references. Liberal salary, WALKLATE & Co., opposite the Pump Room, Bath.

ASSISTANTS WANTED.

ASSISTANT (out-door), about beginning of September, for a light mixed Retail. Apply, with full particulars of previous engagements and salary required, to JNO. H. HACKETT, Pharm. Chemist, Scarborough.

A MEDICAL man has vacancy for Youth, not under 17, at once. He can acquire a thorough knowledge of Dispensing and Pharmacy. Ample time for reading, either for Medical or Pharmaceutical Exams. MEDICUS, 56, Mile End Rd., E.

JUNIOR, of good personal appearance and address, in a light Retail and Dispensing business. One experienced in Dispensing and counter trade. State age, height, salary required, references. Enclose photo. Abstainer preferred. W. H. DIXON, Chemist, East Grinstead.

BY August 29th. An ASSISTANT. Time for study in lieu of salary. Apply personally to W. G. GALE, 6, Nugent Ter., Abercorn Pl., St. John's Wood, N.W.

AT once. Competent ASSISTANT. Indoors. About 22. For brisk Retail and Dispensing business. Must be a first-class Counterman. 8 kept. Apply with usual particulars, to J. H. LEWIS, 22, Great Portland St., W.

OUT-DOOR ASSISTANT. Competent and well-up in Prescribing. Apply personally, to SCHOUVER, Chemist, Princes St., Hanover Sq., London.

A QUALIFIED ASSISTANT, of pushing business habits, who is a good Prescriber for branch. Personal application preferred at 216, St. Paul's Rd., N.

EARLY in September, a competent ASSISTANT, accustomed to good class Retail, Dispensing and Prescribing. Able to take sole charge if required. Salary 30s. per week, with commissions, out of door. Address, A. B., care of Messrs. Hearon, Squire & Francis, Coleman St., London.

NEAR town, out-door, an active business man, well acquainted with Retail, Dispensing, Prescribing, and Tooth Drawing, and capable of taking sole charge when required. Send full particulars, W. B., Messrs. Barron, Harveys & Co., Giltspur St.

JUNIOR or IMPROVER, about 18 or 19, for light Retail and small Wholesale. One accustomed to the latter preferred. Out-door. Time for study if required. Apply, with references, stating salary required, to CHEMICUS, 117, Hessle Rd., Hull. Applications not answered in 3 days may be considered declined.

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YORKS.—A Mixed Family TRADE, in country town Well stocked and neatly fitted up. Average turnover exceeds £500. Very profitable. A pushing man might greatly extend the business. This is such an opening that seldom offers. Address in first instance, to X. Y. Z., Evans, Sons & Co., Liverpool.

KENT.—Old-established Retail and Dispensing BUSINESS. Same hands 16 years. Handsomely fitted and well stocked. Market town. Nice house. Returning £900. Net profit £400. Price £750. Or the seaside branch. Same hands 8 years. Returning £877. Net profit £400. Would sell together for £1400. Owner taking larger business. Purchasers for either or both apply X. Y. Z, 46, St. James Grove, Peckham Rd., S.E.

BUSINESSES FOR DISPOSAL.

IN a Sea-side town of Devon. A Dispensing and Prescribing business with Dentistry. Returns £400 per annum. No patents sold. Shop in main street, well furnished. A churchman would find this a good opening. LEO, Mr. Allen, Messrs. Smith, Queen St. Station, Exeter. Ill-health the cause of selling.

ON offer.—A light profitable Chemist's, &c., BUSINESS, in a healthy fashionable neighbourhood, 50 miles south of London. Applicants must have £2000 to £3000 at command or acceptable securities. Apply in the first instance by letter to CHEMIST & DENTIST, care of L. C. A. A., 402, Strand, W.C.

A GOOD class light Retail and Dispensing BUSINESS, about 50 miles from London. Returns £1200. Incoming about £1100. Good house and premises. Address, STATIM, care of Messrs. Evans, Lescher, & Webb, 60, Bartholomew Close, London.

S.E.—An old established Cash Retail, Dispensing and Prescribing BUSINESS. Good position. Main road. Thickly populated working class neighbourhood. No opposition. Rent on lease £50. Good house and tock. Price £350. Month's trial given. Owner going in for larger business. Address, B. A., Messrs. Davey & Co., Wholesale Druggists, Southwark.

£1500 A FIRST-CLASS Dispensing BUSINESS in a fashionable and increasing south coast sea-side health resort. The pharmacy is handsomely fitted and well stocked. The house is large and with every convenience. Apply in first instance to Mr. DAVIS, 31, Charwood Rd., Putney, S.W.

CRYSTAL Palace District.—Light Retail and DISPENSING. Well situated. Virtually unopposed. Capable of being considerably increased. Handsomely fitted shop. Convenient house, private entrance and garden. £600 capital will be required to purchase. Apply in first instance, Mr. READ, 112, High St., Sydenham, S.E.

MARKET Town near London.—Good class Family Retail and Dispensing BUSINESS. Proprietor retiring. Has been neglected. The position is the best in the town. Shop large and handsomely fitted. A good residence at a moderate rental. Returns £1000 at full prices. Price £850. Address, Mr. GIBSON, 45, Blackheath Hill, Kent.

OLD established Mixed Drug BUSINESS. Rent low. Main thoroughfare ; manufacturing town. Rare bargain to bona fide purchaser. Terms, cash. Apply, JOHN LITCHFIELD, High St., Longton, Staffs.

£300.—Bargain. Good increasing Retail and Prescribing. Dispensing can be increased by a principal. Neglected under unqualified manager. W.C. District. Must be sold. Rent low. Part let off. Address, STATIM, Bromm & Co., St. Paul's Buildings, Paternoster Row, E.C.

TO Chemists' Assistants.—A qualified, respectable man may acquire an old-established small BUSINESS, capable of great improvement, and have immediate possession of stock, fixtures and furniture, paying for same by weekly instalments. Splendid chance for steady young married man. Apply, EXECUTOR, care of Reynell & Son, 44, Chancery Lane.

NORFOLK.—For sale, an old-established Chemist's and Druggist's BUSINESS in a large market town. For particulars apply W. B. GLASIER, Solicitor, 47, Essex St., Strand, London.

IMMEDIATELY.—Small Retail and Prescribing BUSINESS, in a populous and growing neighbourhood. Nice house, private entrance and garden. Rent £44. Let off £30, if necessary. Profits £10 a month. Price £100, part can remain. CHEMIST, 35, Grayshott Rd, Lavender Hill, S.W.

BUSINESSES FOR DISPOSAL.

IN consequence of ill-health, an old-established BUSINESS in the country, some little distance from London, presenting unusual opportunities to any young man of energy and enterprise. Address, A. B., care of Messrs. Edwards & Son, Queen Victoria St., London.

A THOROUGH business PARTNER, in a good old-established Country Business near London. Excellent house and premises. Present owner will retire and leave management to partner. Capital, £500 to £1000, according to share of business. Apply, by letter, R. S. T., Messrs. Barclay, Farringdon St., London. References required.

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A GENUINE Retail and Dispensing BUSINESS in a good town in the eastern counties, seaside preferred. Returning from £1000 to £2000. Every investigation required. Principals only treated with. No agents. Strictest privacy. Apply, with all particulars, to FIDES, Messrs. Wright, Layman & Umney, 50, Southwark St., London, S.E.

IMMEDIATELY. In a healthy and prosperous market town, about 50 miles or so from London, a thoroughly genuine Retail and Dispensing BUSINESS, returning from £600 to £700 a year. Good house accommodation and surroundings indispensable. Must bear the strictest investigation. None but principals treated with. Apply H. J., 2, Pownall Gardens, Hounslow.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

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KENT.—Light Retail and DISPENSING. Returns £800. Net profit £300. Price £600. Position good. Shop handsomely fitted by Treble. Convenient house.

HOME COUNTY.—Retail and DISPENSING, with Mineral Water Factory. Returns £2100. Net profit £500. Price £1500. Every investigation allowed.

SURREY.—Good market town. Retail and PRESCRIBING, with Post Office, which pays rent. Returns £400. Very profitable. Price £250.

LONDON, S.E.—Ready-money BUSINESS, of a profitable nature. Returns £850. Price £800.

LONDON (near).—Light Retail and DISPENSING. Under manager returns £500. Price £500.

Important to Chemists Fitting-up.

FOR SALE.—Handsome nearly new Dispensing Screen, with arched mirror centre and marble slab, 6-ft. long, £6 10s. 12-ft. range of French-polished pine Drawers, gold labelled and crystal knobs, £6 12s. 12-ft. range mahogany ditto, plate-glass labels, £9. Handsome mahogany Case, with tablet and desk, 55s. Four 4-gal. pear-shape Carboys, 10s. each. Four 6-gal., 14s. each. Pine Wall Case, 6-ft. long, £8. Twenty-four 2-lb. blue Jars, labelled, 1s. 6d each. Twenty-four 3-lb. ditto, 2s. each. Twelve 4-lb. best pink ditto, labelled, 5s. each. Handsome bent front plate-glass Case, mirror back, 4-ft. long, £4. Fifteen dozen gold labelled Shop Rounds and Jars (new), £8 10s. Handsome mahogany Tooth Brush Case, with revolving front and mirror back, 60s. Illustrated lists and estimates free.—R. TOMLINSON & SONS, Midland Medical Fitting Warehouse, Bond Street, Constitution Hill, Birmingham.

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Businesses thoroughly investigated for Buyers.

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Warwickshire.—Death vacancy. Returns £900. Same hands 23 years. Price £750, or offer.

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Home County.—Good class Country Trade. Making £800 a year net profit. Price £1800.

Essex (30 miles out).—Retail and Prescribing. Returns £600. Good position. Price £420.

Midlands.—Good class Retail. Making £250 net profit. Returns £665. Rent £30. Only £500.

London, S.E.—Retail and Prescribing. Returns £550. Net profit £250. Only £425.

N.—Few miles out. Unopposed, well-fitted Retail. Returns £6 weekly. Only £140.

TOWN HALL AVENUE, BOURNEMOUTH.

A Shop to Let, suitable for a Chemist or Druggist. Apply to James H. Moore, Bournemouth.

SHOP to be Let, with plate-glass fronts and revolving shutters, at junction of two roads. A capital position for Chemist and Dentist. A room at back of shop, with separate entrance, suitable for a Dispensary, which is much needed. Rent £45 for first year. Apply to Messrs. Willoughby, Estate Agents, next to Streatham Hill and Streatham Stations, S.W.

SPLENDID opening for Dentist.—To Let on moderate terms, the first floor, or the whole of the upper part of the house, over a Chemist's shop, next to Holborn Restaurant. Apply on the premises, or to G. S. Boutall, 52, Marchmont St., W.C.

VACANCY for Dental Pupil. In or out-door. Reference to former pupils. Considerable opportunity for experience in Dental Mechanics from large turn-out for the profession and private practice. Mr. Whitehouse, L.D.S., 8, The Sanctuary, S.W. (opposite Westminster Hospital).

CHEMISTS' TRANSFERS.

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MESSRS. ORRIDGE & CO., Chemists' Transfer Agents, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. Orridge & Co. has been known as a Transfer Agency in the advertising columns of the Pharmaceutical Journal since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer:—

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2. London, S.E. — Good class Retail and Dispensing Business. Returns at present about £500. Large profits. Well fitted shop and good stock. Good house and garden. Price to be arranged.
3. London, S.E.—Good locality. Retail and Dispensing Business. Returns nearly £700. Large profits. Good house, &c. Price about £650.
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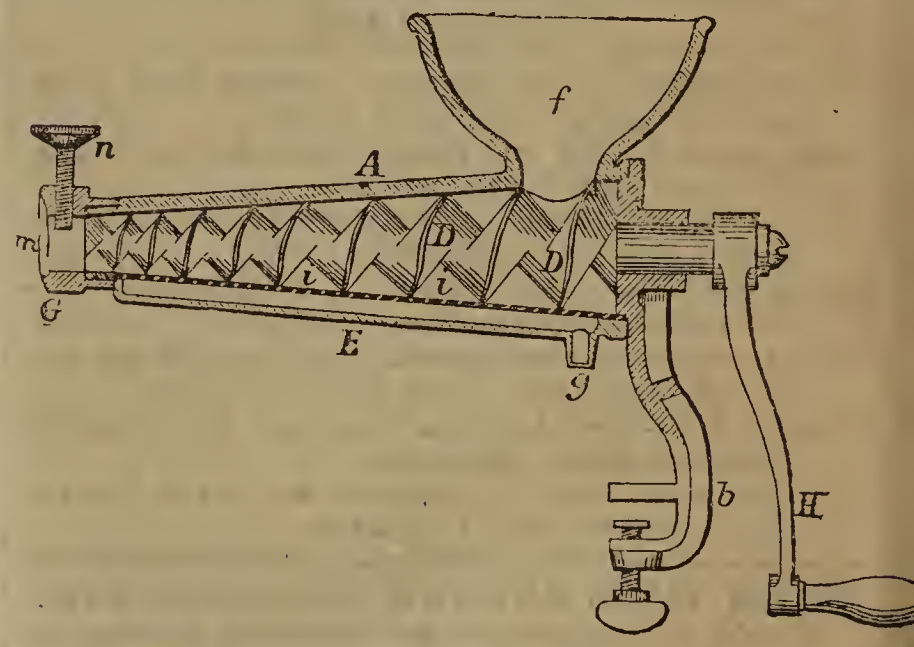

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 22nd to September 5th, both dates inclusive.

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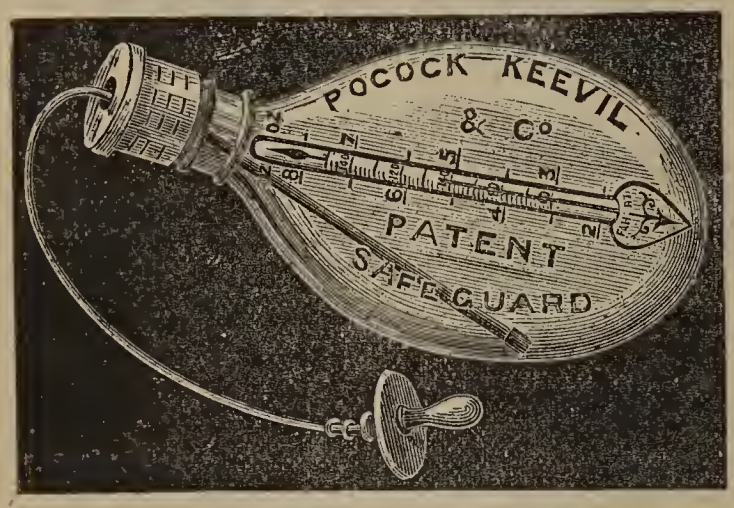

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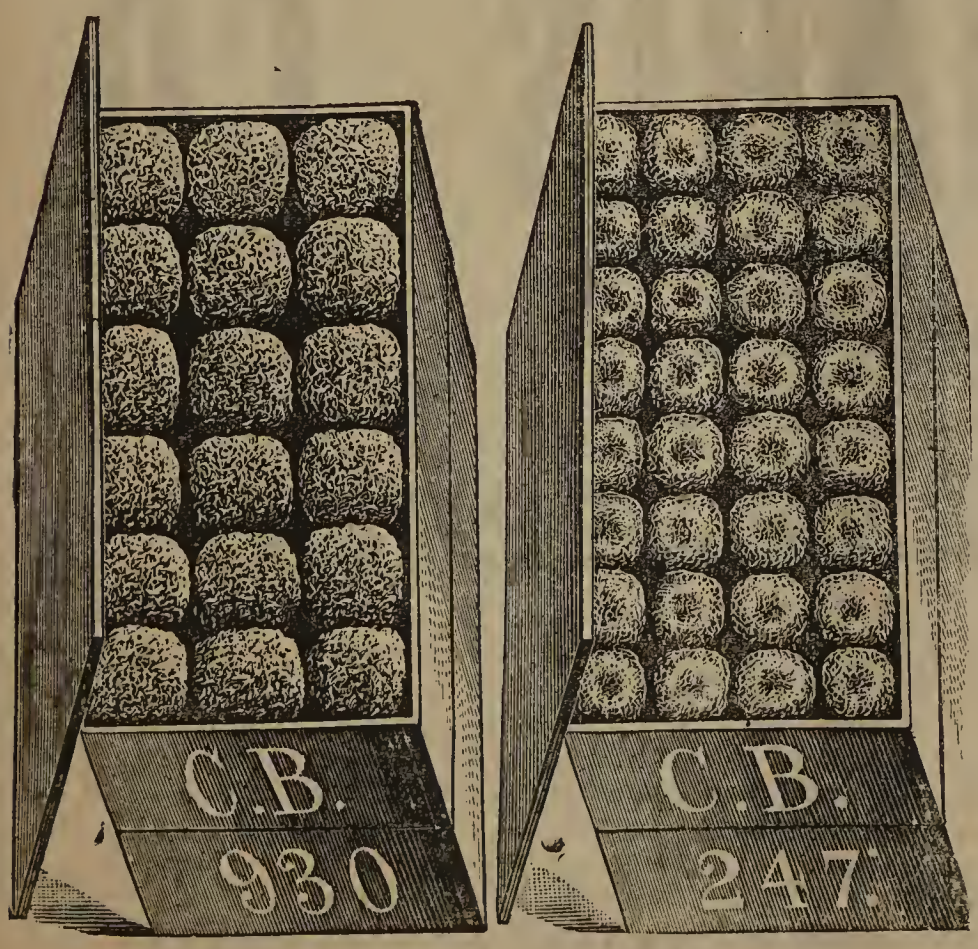

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SPECIAL PRICES ON APPLICATION.

"THE MONTH."

Among the events of the past month most interesting to pharmacists must doubtless be reckoned the meeting of the British Medical Association in Dublin, although few of the topics discussed, even in the Pharmacology and Therapeutics Section, can be described as strictly pharmaceutical. Some of the addresses have been already referred to, and that of Dr. Whitla is reported in another part of this Journal, but several other communications afford material worthy of notice. Among these may be mentioned the reflections on death rates, with special reference to Dublin and its suburbs, contained in the remarkable Address in Public Medicine delivered by the Rev. Dr. Haughton. Dr. Haughton summed up the natural rights of every human being born into the world as consisting in liberty, air, water, food, heat and light. Of these, he said the most important are air, water and food; without air we live three minutes, without water three days, without food three weeks. Referring to the water supply of London he quoted figures showing that it had increased during the last half century from 36,000,000 gallons daily, drawn from the tidal portion of the Thames and more or less imperfectly filtered, to 180,000,000 gallons daily, the whole now being supplied sufficiently pure for practical purposes, though inferior to the water supplied to Glasgow and Dublin. During the same period the population of London has increased from 900,000 to nearly 4,000,000; so that, roughly speaking, the population has quadrupled, and the water supply has quintupled. Next, the relation between density of population and the death rate was referred to, and Dr. Haughton affirmed that the formula contrived by Dr. Farr to express this has a mean probable error even lower than had been supposed. Assuming, however, the existence of an Arcadia where the inhabitants, following agricultural pursuits, are thinly scattered over an open country, favourable to drainage, so that they do not breathe each other's breath, or drink water sullied with impurities, or swallow poison in gin palaces, and whose minds are not overwrought by dissipation, passion or intellectual effort, he thinks a consequent low death-rate would be purchased at a great cost, since "such good people do not live, they only vegetate." Some cities, moreover, show a much lower death-rate than that calculated from Dr. Farr's formula, and the difference may be said to represent the total effect of the sanitary causes acting in favour of such cities. These differences in the three metropolitan cities are represented by the figures 13·89 for London, 15·55 for Edinburgh, and 4·02 for Dublin, from which it would appear that the sanitary causes acting in favour of Edinburgh and London are nearly four times as great as those in Dublin. There is also a remarkable difference between the death-rates of Dublin and its suburbs, the mean of the last five years being 30·11 for the city and only 22·83 for the suburbs. The death-rate for the whole of Ireland is low, the highest in the last five decennial periods being 18·3 for 1871-81, when, curiously enough, the density of the population was lowest. Another interesting point mentioned was the difference in the relation between cold and death-rate in Dublin and in London. It was stated that when the thermometer falls from 40° to 32° F. the greater cold increases the death-rate in London by 5·6 per 1000, and in Dublin by 8·9 per 1000.

Haughton on Death Rate.

Another paper read in the Section of Public Medicine, by Dr. D. Edgar Flinn, was on the development of Irish health resorts, in which it was claimed that in Ireland there is a variety of both inland and seaside health resorts that can compare favourably with those of any other country, though at present they are much neglected. Among those specially mentioned were Lucan Spa, within a few miles of the city of Dublin, where there is a powerful alkaline sulphur spring; Lisdoonvarna Spa, in the county of Clare, where there are chalybeate and sulphur springs of great value; and Ballanahinch, Golden Bridge and Swanlinbar sulphur springs. Besides these it was stated that there are numberless chalybeate springs throughout Ireland.

Irish Health Resorts.

The Address in Surgery, by Dr. Edward Hamilton, may be described as an exposition of views equally removed from those which unduly ignore the evil potentialities attributed to air-borne germs and those which invest the germs with such qualities as would, if real, almost make life incompatible with an abrasion or cut in the flesh. Dr. Hamilton thinks that hitherto attention has been too exclusively fixed upon the germs, and sufficient regard has not been had to the influence of environment. Every effort has been strained simply to discover the most deadly and effective germicide, although it is known that the germs, however virulent they may be, cannot undergo their life changes and produce their effective results unless their environment, like the cultivation liquids of the histo-pathologists, is capable of developing and sustaining these changes. Deposited on clean metal, glass or porcelain, the organisms die of inanition; they exercise no influence whatever, and are amenable to none. But in contact with dead organic matter, or living matter in certain conditions of altered or reduced vitality, they become a teeming source of decomposition and decay. If, therefore, Dr. Hamilton asks, pathological surfaces could be brought to and maintained in such a condition that they would not afford a suitable cultivation ground, would not almost as much be accomplished as if the germs were destroyed? This point he illustrated in various ways, and testified to the good results obtained in treating open wounds with a solution of chloride of zinc, notwithstanding that Dr. Koch has pronounced that compound to beinert as a germicide. But although it may not be directly poisonous to germs, Dr. Hamilton believes that chloride of zinc is capable of rendering a cut surface a barren cultivation ground, and infers that it will produce a similar effect on the walls of an abscess.

Tissue Resistance and Antisepticism.

In a paper by Mr. John Brown, Medical Officer of Health of the Borough of Bacup, testimony is borne as to the prophylactic advantages attending the early and continued inunction of carbolized oil in cases of scarlet fever. The carbolized oil used contains five per cent. of pure carbolic acid, and as soon as the rash is out this is applied all over the body except the face, for which olive oil is used. The inunction is repeated twice a day, with a warm bath every night, and the treatment is continued until the sixth week, by which time it may be expected that the desquamation of the skin is complete, and the

Carbolized Oil in Scarlet Fever.

patient therefore no longer capable of conveying the infection.

Antipyrin.

A discovery has been made respecting the therapeutic value of antipyrin that should go far to make it a popular remedy. Dr. J. Ogilvy of Bournemouth, states (*Brit. Med. Journ.*, p. 123), that in his experience it has proved of great value in the treatment of that most distressing disorder known as a bilious headache. He has found that antipyrin in 8 grain doses is wonderfully potent not only in cutting short the attack, but in sensibly diminishing the frequency of its occurrence. The dose is given either in a wafer capsule, or simply dissolved in a little water, on the first recognition of the attack, the patient lying down in a darkened room. A second dose in an hour, and rarely a third and fourth dose are required, but generally sleep or a pleasant langour follow the first or second dose, accompanied by gradual relief from headache. No unpleasant after-effects are felt, but the appetite at once returns and the patient feels well.

Antipyrin as a substitute for Morphine.

In a recent communication to the Academy of Sciences (*Comp. Rend.*, cv., 103) M. See affirms that antipyrin may with advantage replace morphine in nearly, if not all, cases where that alkaloid is injected subcutaneously for the relief of pain, antipyrin being free from many of the objectionable consequences attending the use of the opium alkaloid, especially that known as morphinism. He mentions among others a series of cases of articular rheumatism cured by two or three injections of 0·5 gram of antipyrin dissolved in an equal weight of water, aided by the administration of the medicine internally; also the relief of pain in acute and chronic gout, neuralgia, lumbago, angina, etc. The subcutaneous injection of antipyrin is said not to be followed by sleepiness, nor by vomiting or excitement, but after a short sensation of tension there is a considerable remission of pain from whatever cause.

Antipyrin and Antifebrin.

The action of antipyrin as compared with antifebrin has been tried by Dr. G. W. Barr, by experiments on himself. He finds that while the use of antipyrin is followed by a feeling of great *malaise*, with antifebrin there are no after-effects. Antipyrin caused diaphoresis and slightly slowed the pulse; antifebrin caused diuresis and strengthened the pulse. Dr. Barr prefers antifebrin because the dose is smaller, the effect on the temperature more powerful and more permanent and the influence on the heart tonic, while it is without unpleasant after-effects. The comparatively slow action is the only objection to its use.

Salol.

Salol is stated by Dr. Aschenbach, of Corfu, to be a most useful remedy in sciatica. He took a dose of 8 grains each evening and double the quantity on going to bed, sleep being soon induced, and he remaining free from pain during the whole night (*Pharm. Record*, p. 230).

Ammonium Borate.

The latest remedy in vogue for the treatment of phthisis appears to be borate of ammonium, which has been found by Professor Lashkevich of great value, producing a marked effect on the expectoration and in some cases diminishing pyrexia in the early stages of the disease. The dose given was 5 grains three times a day, combined with codeine, henbane or other sedatives.

Zinc Cyanide.

The same authority has found in cyanide of zinc a remedy which exerts a beneficial effect on some cardiac cases, such as cannot be obtained by other means, particularly in cardiac neuroses, in which it acts quickly and certainly. Palpitation, want of rhythm and pain in the region of the heart are quickly relieved and sometimes cured. The dose given varies from a tenth to an eighth of a grain three times a day.

Aqua Laurocerasi.

In a note in the *Répertoire* (Aug., p. 331) M. Perinelle points out the importance of always ascertaining the strength of aq. laurocerasi before it is placed in stock. His experiments have led him to the conclusion that the strength of the liquid in hydrocyanic acid will vary considerably according to the time of year at which it is prepared and to the variety of the cherry laurel employed. The two periods of the year when the leaves are most readily obtained in quantity are May and November, when the shrub is clipped. Cherry-laurel water prepared in May yielded only 39 milligrams of hydrocyanic acid per 100 grams of water, but that prepared in November afforded 134 milligrams per 100 grams. M. Perinelle is of opinion that the variety *Caucasica* is the one that should be official. The leaves are thicker, darker, less rounded than those of the variety *Colchica*, and the plant is more robust and less susceptible to frost. The leaves also yield a larger quantity of volatile oil, 75 grams per 50 kilograms.

Chloral Cyanhydrate.

Another suggestion for avoiding the uncertainty attending the use of cherry-laurel water, bitter almond water, and similar preparations owing their virtue to the presence of hydrocyanic acid, is made by Herr Hermes (*Pharm. Centralh.*, Aug. 11, p. 396). It consists in the use of chloral cyanhydrate, a compound first prepared by Messrs. Pinner and Bischoff, and ascertained to exercise the same physiological action as pure hydrocyanic acid. Chloral cyanhydrate is represented by the formula $CCl_3-CH<\begin{matrix}OH\\CN\end{matrix}$ and it is described as crystallizing from water as a powder consisting partly of colourless prisms and partly of rhombic tables, and as being easily soluble in water, alcohol and ether. With the vapour of water it volatilizes in small quantity, which breaks up into its components, chloral and hydrocyanic acid. Chloral cyanhydrate is also decomposed by alkalies, with the re-formation of hydrocyanic acid. The compound is very stable, and aqueous solutions of it remain a long time unaltered. 6·46 parts by weight of chloral cyanhydrate correspond with one part of anhydrous hydrocyanic acid.

Hygrophila spinosa.

Hygrophila spinosa forms the subject of a series of experiments which are given in detail in the *British Medical Journal* (July 16, p. 118), by Mr. Jayesingha. He states that the plant is considered by native practitioners in Ceylon as one of the best remedies for dropsy. In four out of six cases the patients to whom the drug was given by him were cured of dropsy. In the fifth the stay of the patient in the hospital was too short, and in the sixth the appearance of symptoms of inflammation of the lungs led to the discontinuance of the remedy. Mr. Jayesingha quotes from Dr. Kirkpatrick the statement that he frequently employed it in dropsical cases and that it undoubtedly possesses considerable power as a diuretic, the latter property being also mentioned by Dr. Gibson. The formula used by Mr. Jaye-

singha was as follows :—Take of the dried plant 2 ounces, infuse in a pint of boiling water for half an hour and strain. This quantity is administered during twenty-four hours in divided doses. Dr. Dymock, in the 'Materia Medica of Western India,' remarks that although the plant is little used in that part of India it has a reputation both with Sanscrit and Mahometan writers as a remedy in hepatic obstruction with dropsy, and also in rheumatism and urinary affections. In Bombay the seeds alone are an article of commerce, and these are used as an aphrodisiac and diuretic. The plant is a native of the western coast of India, but appears to be more valued on the eastern coast in Malabar.

Embelia ribes.

Dr. Harris, of Simla, directs attention (*Lancet*, July 23, p. 199), to the value of the fruit of *Embelia ribes* in tapeworm. He states that he has used it for the past four or five years in cases of tapeworm, both for natives and Europeans, with good results. The dose of the powdered fruits is one to four drachms given with milk and curds early in the morning. Dr. Harris thinks that the active principle might be a more convenient form of administering the drug, and has asked Dr. Warden to try and isolate it. The fruits are about the size of small peppercorns and are aromatic. According to Dr. Dymock they have recently been exported to Germany, and are stated by Dr. Harris to be used there as a chief ingredient in several patent medicines for tapeworm. The administration of the fruits is said to turn the urine red. The fruits seem therefore to deserve further examination, both from a chemical and a physiological point of view.

Enterolobium Timbouva.

Another plant has recently been added to the list of plants containing saponin. This is *Enterolobium Timbouva*, Mart., a leguminous tree indigenous to Brazil. Saponin is found in all the organs of the plant, according to M. Licopoli, but more especially in the pericarp of the fruit (*Bull. Soc. Bot.*, p. 49).

A Rival to Cocaine.

Dr. Claiborne, of New York, reports upon a new local anæsthetic, which in his opinion promises to be a rival to cocaine (*N. Y. Med. Rec.*, July 30). It is described as being an alkaloid derived from the leaves of a tree as yet unidentified; but as the tree resembles the *Acacia stenocarpa* he proposes to call the "alkaloid" stenocarpine. Preliminary experiments upon animals having established the anæsthetic action and the harmlessness of this substance, various eye operations were performed upon human beings after the application of two to four drops of a 2 per cent. solution. This quantity is stated to have produced a complete insensibility of the cornea and conjunctiva lasting twenty minutes; in addition there was a gradual dilatation of the pupil until it no longer responded to light or accommodation, and a decrease in the tension of the eyeball was observed at the same time. Stenocarpine is said also to exercise an anæsthetic action on the mucous membrane of the nose sufficient to allow minor operations to be performed painlessly. The discovery of the value of the new remedy is attributed to an accident, a veterinary surgeon who had in the absence of better material applied a poultice of the leaves to an abscess in a horse, having noticed, when subsequently opening the abscess, the existence of a complete anæsthesia.

Solanine Salts.

Apropos of the recommendation some months since by Dr. Geneuil of solanine in the form of hypodermic injection for sciatica and neuralgia, M. Adrian remarks (*Répertoire*, Aug., p. 333) that the so-called hydrochlorate and sulphate are not true salts of solanine, and that the caustic action attributed to the sulphate must be due to the free acid in the so-called salt.

Anemonin.

Anemonin, the active principle of *Anemone Pulsatilla*, is stated by M. P. Vigier (*Journ. de Pharm.*, p. 99) not to possess the active properties of the fresh plant, which he believes are due to an essential oil, since the distilled water made from the fresh plant is extremely acrid, causing symptoms of severe coryza, but in a short time becomes turbid, loses its acridity and deposits anemonin. The anemonin, $C_{15}H_{12}O_6$, therefore, he believes to be formed by the oxidation of the essential oil. Anemonic acid, which contains one equivalent more of oxygen, is formed when anemonin is dissolved in an alkaline solution. It may be remarked that M. Vigier does not appear to be acquainted with the paper on this subject by Dr. Beckurts (*Pharm. Journ.*, [3], xvi., 365), in which the acridity of a freshly prepared distillate is attributed to "anemone camphor," an unstable compound which in contact with water undergoes decomposition into anemonin and anemonic acid. M. Vigier attributes the ready absorption of anemonin by the stomach to the fact that it is readily soluble without alteration in hydrochloric acid (although it is rapidly destroyed by nitric and sulphuric acids). He does not think it is so poisonous as is generally supposed, having himself frequently taken 10 centigrams without any poisonous effects. Yet in doses of 2 to 4 centigrams per day its anticatarrhal effects and its action on the nervous system are manifested. In consequence of the high price of anemonin he recommends the tincture of the fresh root to be used, made of equal weights of the fresh root and alcohol of 90 per cent., the dose being 2 to 4 grams per day. If a tincture of the leaves be preferred, it is made of the same strength but the leaves being less active than the root the dose given is from 5 to 10 grams daily.

Andromedotoxin.

The investigation of Professor Plugge, to which reference has been made on more than one occasion, has shown that andromedotoxin is not only the toxic principle of the andromedas, but probably also of all the poisonous ericaceous plants. This compound has now been prepared in considerable quantity from the *Rhododendron ponticum* by Herr de Zaayer, who has further investigated its properties (*Chem. Zeit.*, July 31, p. 183). He reports that pure andromedotoxin occurs in white delicate crystalline needles, melting at 228° to 229° C., with signs of incipient decomposition, but bearing a temperature of 100° C. for a long time without alteration. The compound is soluble in alcohol, amylic alcohol, chloroform, ether and benzol, and three times more soluble in cold than in boiling water. It shows the peculiarity that its solutions in water, alcohol and amylic alcohol are lævogyre, whilst a chloroformic solution is dextrogyre. Andromedotoxin belongs to the class of indifferent bodies; its solutions in indifferent liquids have an alkaline reaction, but it is not precipitated by any of the alkaloidal reagents, nor by solutions of metallic salts, neither does it reduce Fehling's solution. Strong sulphuric acid gradually dissolves it with a brown colour, but if heated on a water-bath with dilute sulphuric acid it assumes a beautiful rose

colour. Dilute hydrochloric and dilute phosphoric acid affect it similarly, the colour being more violet-red with the former, and mulberry-red with the latter, the reaction taking place in each case with a very minute quantity. The composition of the pure substance is most simply expressed by the formula $C_{31}H_{51}O_{10}$.

Oil of Black Pepper.

In a communication upon the essential oil of black pepper (*Archiv*, June 30, p. 515), Herr Eberhardt describes it as having the characteristic odour of pepper, a greenish colour and a specific gravity at 15° C. of 0·8735. It does not mix with alcohol of specific gravity 0·830, but becomes miscible after the addition of ether. By fractional distillation it can be separated into a terpene that is slightly lævogyre, has a specific gravity at 20° C. of 0·858 and boils at 160·5° to 171° C., and some isomeric compounds having a higher boiling point. The fraction boiling at 180° C. was colourless; those boiling between 180° and 190° C. were greenish, between 190° and 250° green, and between 250° and 310° blue-green. There then remained a brownish viscous residue, in which no phenol was detected.

Ether Explosion.

The occurrence of a relatively violent explosion during the evaporation of an ethereal extract of a sample of "coprah" is the subject of a communication by Professor Schär (*Archiv*, July 30, p. 623). The sample of "æther purus" that had been used to extract the "coprah" had been kept for several years, but had not previously exhibited any abnormal property, though in the evaporation of the fatty solution in question it was noticed to give off an acrid odour and cause irritation to the nose and eyes. A number of experiments were made in evaporating separate portions of ether from the same sample, but no further explosion occurred until a portion was used that had previously been in contact with "coprah," and consequently contained some fat from that source. It was ascertained, however, that the explosion was not dependent upon the presence of "coprah" fat, but occurred with more or less violence when any animal or vegetable fat was mixed with the ether. Subsequent examination revealed the presence in the ether of a considerable quantity of hydrogen peroxide, and Professor Schär appears inclined to credit this ingredient with being the prime factor in the explosion, though he does not think that the possibility is excluded of the presence of ethyl peroxide $(C_2H_5)O_3$, a highly explosible compound described by Berthelot as being formed during the distillation of ether.

Lanolin Emulsion.

According to Herr Hoefte lanolin is now sometimes ordered as an emulsion (*Zeit. österr. Apot.-Ver.*, xli., p. 305). In dispensing such a prescription he recommends that the lanolin be first rendered anhydrous by prolonged heating, then weighed and rubbed up with half its weight of powdered gum and finally diluted with the desired quantity of water.

Dr. Felix's Caustic Paste.

A new caustic paste has been devised by Dr. Jules Felix, which possesses the advantages of not being deliquescent and of keeping a putty-like consistence, being in consequence easily manipulated. It does not cause severe pain, or set up any general reaction; the eschar is hard and well defined, and the caustic acts also as an antiseptic and hæmostatic. The formula given for the paste is as follows:—Starch, 37 grams; wheat-flour, 112 grams; bichloride of mercury, 1 gram; dry chloride of zinc, 110 grams; pure iodol, 10 grams; croton chloral, 10 grams; bromide of camphor, 10 grams; crystallized carbolic acid, 10 grams; distilled water, sufficient to form a stiff homogeneous paste. The hand should be wetted when applying it. The paste is allowed to remain on from six to twenty-four hours, according to the amount of eschar it is desired to form (*Lancet*, August 6, p. 277).

Aromatic Waters.

For the purpose of disseminating essential oils such as dill, peppermint, etc., in water, Mr. R. L. Igel recommends the following simple process. Distribute the essential oil over a piece of filter paper, fold the paper up and tear it into small fragments; add a small quantity of water (an ounce for 30 drops of oil) and shake in a suitable bottle until the paper is reduced to a pulp; then add more water, one or two fluid ounces at a time, shaking well after each addition; lastly, add the bulk of the water, reserving sufficient to wash the pulp when the liquid is filtered (*Amer. Journ. of Pharm.*, p. 392).

Urine Testing.

In estimating the urea in albuminous urine by means of solution of hypobromite of soda, the operation is frequently retarded by a persistent frothing which interferes with the reading of the volume of nitrogen. This frothing is especially abundant, fine and persistent when the liquid is at the same time rich in albumen, charged with pus and more or less advanced in ammoniacal decomposition. To meet this difficulty Dr. Méhu suggests (*Journ. Pharm.*, [5], xv., 607) the introduction of a small pellet of suet into the tube in which the reaction between the urine and the hypobromite is effected. This he has found to disperse instantaneously the frothing in all cases. The plan was suggested by the observation of the effect of melted tallow upon the serous liquid running from a dropsical patient in the operation of tapping and that of a small quantity of butter added to diminish the frothing of a boiling syrup.

Bases in Paraffin Oil.

The occurrence of alkaloid-like substances in paraffin oil has been commented upon by more than one author, but hitherto little has been done towards their separation and identification. An investigation of this kind is now, however, reported by Herr Weller (*Berichte*, xx., 2097). In this case the material worked upon was a "paraffin oil" obtained as a bye-product in the Saxony paraffin industry, and used in the quinine manufacture. The alkaloidal constituents occur in this oil only when proper care has not been taken during the purification of the brown-coal tar oil by means of sulphuric acid, and then only in small quantity. When the purification is properly carried out, the basic substances present are for the most part removed by the acid. The basic constituents were separated by shaking the oil with dilute sulphuric acid, treating the acid liquor with soda solution and then taking up the bases with ether. Upon distilling the yellow-brown strongly green fluorescent ethereal solution one portion of the bases was obtained as a coloured oily liquid of sp. gr. 0·98 to 0·99, with a very intense disagreeable smell, which when the liquid was warm resembled that of pyridine and when cold had a mouldy odour. It dissolved very slightly in water, but mixed very readily with alcohol, ether and chloroform. It contained nitrogen, but was free from oxygen and

sulphur, and when heated with strong potash solution it evolved strongly alkaline vapour, but no ammonia. The greater part distilled between 220° and 260° C., the thermometer rising regularly all the time, but the first portion passing over smelt somewhat differently from the last portion. On the other hand the whole formed a crystalline compound with oxalic acid. The residue from the ethereal solution left in the retort was of a basic character, and apparently contained the constituents upon which the fluorescence depended.

Cinchona Cultivation in Victoria.

Some years ago several species of cinchona plants were raised and distributed by Baron F. von Mueller for test culture in Victoria. Some of these in the estate of Mr. G. W. Robinson, of Berwick, Western Port District, flowered and ripened seed a few years since, and now the bark has been analysed by Mr. W. E. Matthews, who gives the percentage of alkaloids as 6½ per cent. As the Berwick estate is only 100 feet above the sea level, and its distance from Melbourne only thirty miles, it seems evident that some species of cinchona can be successfully cultivated at a much lower level than hitherto supposed (*Gard. Chron.*, August 13, p. 196).

Lappa officinalis.

The *American Journal of Pharmacy* for August contains an analysis of burdock root (*Lappa officinalis*, All.) by Mr. Wechler, in which the presence of a glucoside, as well as fixed oil and resins are indicated. Also an analysis of the rhizome and rootlets of *Cypripedium parviflorum* by Mr. E. S. Beshore, who found in them a peculiar acid allied to tannic acid, but distinct both from it and from gallic acid, as well as traces of volatile oil and fixed oil, and a small percentage of resin, but neither alkaloid nor glucoside.

Cypripedium parviflorum.

The occurrence of similiar or identical odours in plants of widely-separated natural orders is one of the curious phenomena of the vegetable kingdom that chemists have yet to explain. At the last meeting of the Royal Horticultural Society a new and beautiful orchid (*Catasetum Bungerothi*) was shown, which had a distinct odour of caraway (*Gard. Chron.*, Aug. 13, p. 200).

Catasetum Bungerothi.

According to a note in the *Pharmaceutical Record* (Aug. 1, p. 229) a very large proportion of the balsam of copaiba imported into the United States is used to obtain the volatile oil, which latter is "used almost exclusively to adulterate other volatile oils."

Oil of Copaiba.

A new Alpine plant has been added to the British flora during the month of July in *Arabis alpina*, which was found by Mr. H. C. Hart in the Island of Syke. The plant is common in the Swiss Alps, and extends northwards to Lapland, Greenland and Norway; hence it might be expected to occur in the Scotch Highlands.

New British Plant.

A curious monstrosity of the strawberry is figured in the *Gardeners' Chronicle* (August 6, p. 164), which was supposed to be as extinct as the dodo, but appears to have existed in the Edinburgh Botanic Gardens for many years past, and to have been used during the last eight years, at least, to illustrate Professor Dickson's lectures. In this strawberry the achenes or carpels are turned to leaves, or rather leaflets, each resembling a small bract. The thalamus is, nevertheless developed, and becomes fleshy, although not very large. It appears to have been found in the first instance more than two hundred and fifty years ago by the celebrated botanist, John Tradescant, in a garden at Plymouth.

Strawberry Monstrosity.

In a paper presented to the Academy of Sciences, M. Albaretz attributes the formation of indigo from the colourless glucoside to the action of a special microbe (*Comp. Rend.*, cv., 286). He states that if some leaves of the indigo plant be macerated in a little sterilized water, at the end of from twelve to twenty-four hours a pellicle of blue matter appears on the top of the water, an elevation of temperature and evolution of gas being observed at the same time. Upon rupturing the pellicle indigo is precipitated, and a new pellicle is formed, the blue colouring matter being always produced on the surface of the liquid and in contact with air. Upon examining the pellicle under a microscope, it will be seen to consist of a large number of microbes surrounded by delicate crystals of indigo arranged in a peculiar manner. These micro-organisms were separated by the author and demonstrated to be the agents of the oxidation. It was found that if a decoction of the leaves was sterilized and then preserved in a Pasteur flask, no indigo was formed, and the reddish colour was maintained for several months; but that if a few microbes from a pellicle were added, there was in the course of a few hours an abundant production of indigo. The micro-organism is said to be easily cultivated in agar peptone at a temperature of 37° C. It is described as closely resembling the microbes of pneumonia and rhinoscleroma, and like them capable of producing pathological effects, whilst the pneumonia and rhinoscleroma microbes are, on the other hand, capable of producing the indigolic fermentation.

The Indigo Ferment.

Some interesting observations as to the action of the micro-organisms occurring in the mouth upon some alimentary substances and fæcal matter are recorded by M. Vignal (*Comp. Rend.*, cv., 311). The author states that he has obtained from the mouth 19 different kinds of micro-organisms. Of these 7 dissolve albumen and 5 cause it to swell and become transparent; 3 dissolve fibrin and 4 cause it to swell and become transparent; 9 dissolve gluten; 7 coagulate milk; 6 dissolve casein; 8 convert starch; 9 convert lactose into lactic acid; 7 invert cane sugar, and 6 ferment glucose. Artificially prepared pancreatic juice and bile exercise no injurious effect upon the organisms. In the fæcal matter the author found six of the mouth micro-organisms and four others similarly active. The action of these micro-organisms upon food must be considerable, since the author calculates that one decigram of fæcal matter contains upwards of twenty millions of organisms. In some experiments as to their activity, made in flasks, the organisms became less energetic after a time and eventually inert; but this probably does not represent what takes place in the body, where the products of their action are continually removed.

Micro-organisms of the Mouth.

Dr. Stumff describes a simple and inexpensive method of protecting small quantities of ice from external warmth in the absence of a regular ice-cellar (*Münch. med. Woch.*, Aug. 16, p. 647). It consists in packing the ice in a suitable vessel between layers of

Storing of Ice.

barley chaff, six to eight inches thick, surrounding it on all sides. He states that if this be carefully done the containing vessel may be kept in a room having a temperature of 20° to 25° C. for five or six days, without losing more than one-fourth of the ice by melting during that time. Such an arrangement might be used as an impromptu ice-cellar for keeping articles of food or drink at a low temperature.

NOTES ON CHINESE MATERIA MEDICA.*

BY CHARLES FORD, F.L.S.,
Director of the Botanical Gardens, Hong Kong,
HO KAI, M.B. ABERD., ETC.,
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(*Continued from p. 77.*)

IV.—STRYCHNOS PANICULATA, Champ. STRYCHNOS ANGUSTIFLORA, Benth. N. O. Loganiaceæ. We have no evidence to show that the seeds of these two species are used in medicine by the Chinese, nor can any reference to them be found in native botanical works. As any information regarding the genus *Strychnos*, even though it be of a negative character, is of interest, it was considered advisable to insert these few details before leaving the natural order Loganiaceæ.

Both these species are to be found on the island of Hong Kong; but *S. angustiflora*, although very common in the colony, is not recorded from elsewhere. *S. paniculata* is unknown out of South China.†

A good supply of the attractive orange-like fruits, presumably of both species, were gathered by us near the village of Sheko on the island of Hong Kong, in November, 1884. The seeds, when freed from the surrounding pulp and dried, weighed on the average 8 grains. They closely resemble, in form, the seeds of *S. Nux-vomica*, but are much smaller, being only three-eighths to five-eighths of an inch in diameter.

Neither strychnine nor brucine could be detected in these seeds. A fluorescent body—the exact nature of which has not yet been determined, and which gives an alcoholic extract of a yellowish-green appearance—was, however, observed.

The pulp has not been chemically examined. Mention might be made that on several occasions we have found pulpless fruits scattered on the ground beneath the trees, the pulp having evidently been pecked out by birds. We are reluctant, however, to receive this as evidence that the pulp is harmless, because in India some birds are said to be very fond of the strychnine-containing pulp of the nux vomica fruit ‡

V.—BASELLA RUBRA,§ Linn. N. O. Chenopodiaceæ. *Hiung têng ts'ai.* Some months ago this plant was sent to us by a correspondent, with the remark that he had been recommended to use it by several intelligent Chinese for a severe case of dysentery one of the members of his family was suffering from.

If anything was needed to demonstrate the necessity of the Chinese being trained in the art of western medicine it would certainly be found in the fact that a plant in common use as a pot herb, both in India and China is selected for the treatment of such a disease as dysentery.

Many plants of the natural order Chenopodiaceæ furnish material suitable for culinary purposes. The one here noticed is said to yield in addition a fine purple dye, but the colour, according to native opinion, is not a very lasting one.

By the Chinese in Hong Kong it is also regarded, when boiled with lean pork, as a remedy for hæmoptysis.

In addition to the above name, the one by which this plant was designated in Canton and Hong Kong we subjoin the following taken from the *Pên ts'ao*:—*Lo k'wei, Chiung k'wei, T'éng k'wei, T'ien k'wei, Fan lu, Yü ts'ai, Yien chih ts'ai.*

Loureiro, in his 'Flora Cochin-chinensis' (1793), ed. Willdenow, p. 222, states that it is met with both wild and cultivated in Cochin-China, where it is known as *Cây boung toi.*

The author of the *Pên ts'ao* ascribes refrigerant and emollient properties to this herb; the juice of the fruit is sometimes used by the Chinese ladies as a face paint.

VI. PLATYCODON GRANDIFLORUM.* A. DC. N. O. Campanulaceæ. Syn., *Wahlenbergia grandiflora*, Schrad., *Platycodon chinense*, Lindl. *Chieh kêng.* We have conconfirmed the observations of previous investigators† as to the identity of the drug *Chieh kêng* with the root of this beautiful campanulaceous plant. Specimens from the native drug warehouses exactly correspond with the characters of the root of *P. grandiflorum* gathered by us on the island of Hong Kong. A fairly accurate figure of the shrub may be seen in the Chinese botanical work 'Chih wu ming shih t'u kao,' part ii., vol. viii., p. 11.

It grows on exposed situations on the island of Hong Kong, near Cape Collinson and the village of Stanley, etc.; also according to the Rev. Father David, in Mongolia, Kiangsi and the plains of Pehchili. It is common also in Manchuria. In the *Pên ts'ao* it is said to be common, on exposed roads and hill sides, all over China.

The root, as found in the Hong Kong drug shops, occurs in pieces from 5 to 9 inches long and five-eighths of an inch broad, much shrivelled, of a whitish colour, the epidermis having been removed. On most of the specimens the crown of the root may be seen. A section shows the yellow meditullium, occupying fully three-fourths of the entire diameter, surrounded by the brownish cortical layer. Near the base of the root the latter is quite as thick as the meditullium, and of a much lighter colour, and a distinct brown line marks the line of demarcation between the two.

The native merchants state that the supply comes chiefly from Szechuen. A quantity is also said to reach the Hong Kong market from Tientsin and Kwangsi.

It appears to be a favourite drug with the Chinese, being used as a tonic, astringent, sedative, vermifuge and carminative. It is also regarded as efficacious in dysentery, cholera, and in pulmonary and nervous affections.

VII.—MELODINUS SUAVEOLENS, Champ., vel MELODINUS MONOGYNUS, Roxb. N. O. Apocynaceæ. *Shan ch'êng* (*Mountain Orange*). Dr. Porter Smith, on p. 146 of his 'Materia Medica,' states that *M. monogynus* "is said to be found in China, but is unknown to Chinese here" (Hankow). This species, as well as *M. suaveolens*‡ and *M. fusiformis*, is indigenous to Hong Kong.

The bright red fruits of one or more species of *Melodinus* are familiar objects in the herbalists' shops in Hong Kong, where they may be usually seen suspended by a portion of the branch of the tree. The berries are globular, and from 2 to 3 inches in diameter.

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* Reprinted from advance sheets of the *China Review*, communicated by the authors.

† 'Flora Hongkongensis' (1861), p. 232.

‡ 'Pharmacographia' (1879), p. 423.

§ 'Flora Hongkongensis' (1861), p. 283. 'Pên ts'ao kang mu,' chap. xxvii., No. 594; 'Chih wu ming shih t'u kao,' part ii., vol. iv., p. 6.

* 'Flora Hongkongensis' (1861), p. 197.

† Tatarinov, 'Catalogus medicamentorum sinensium' (1856); No. 444. F. Porter Smith, 'Contributions towards the Materia Medica and N. History of China' (1871), p. 173. Soubeiran and Dabry de Thiersant, 'Matière Médicale chez les Chinois' (1874), p. 170. Bretschneider, *Journal of the N. China Branch of the Royal Asiatic Society*, vol. xvi., part i., p. 57. 'Pên ts'ao kang mu,' chap. xii., No. 93.

‡ Syn. *Lycimma suaveolens*, Hance; found also on the adjacent continent: 'Flora Honkongensis,' p. 218. The specimens of this species in the Hong Kong Botanic Gardens do not bear fruit.

The Chinese employ them for the treatment of glandular swellings, particularly those of the neck. They are also said to produce a soothing effect when used to allay troublesome coughs. In both instances the drug is used internally.

It is not an "official" medicine. No mention is made of it in the *Pên ts'ao*, but a good illustration of the plant in fruit may be seen in the 'Chih wu ming shih t'u kao,' part ii., vol. xxi., p. 57.

SOME OFFICIAL AND NON-OFFICIAL IODIDES.*

BY R. ROTHER.

Plumbic Iodide.—According to a formerly official process plumbic iodide was prepared by mixing certain proportions of plumbic acetate and potassic iodide in aqueous solution. The writer has usually employed this process, which yields an apparently amorphous lemon-yellow powder. Recently it was noticed that a purchased sample of the iodide possessed an orange tint, together with the peculiar iridescence of the crystalline salt. With a half-inch power, it, however, evinced no crystallescence. But this indication is no positive evidence of the total absence of crystals, since various amorphous bodies have the capacity of utterly concealing crystalline substances mingled with them. Plumbic acetate does not form a clear solution when dissolved in water alone. Potassic iodide is invariably contaminated with carbonate. Hence these two causes are in themselves sufficient to overcome a moderate tendency to crystallescence or to obliterate such crystals as may form. In order, if possible, to avoid such interference a solution of plumbic acetate, rendered limpid with a little acetic acid, was mixed with a solution of ferric iodide. The resulting precipitate was a mixture of plumbic iodide and free iodine. Plumbic acetate was then treated with ferrous iodide in a similar manner. A lemon yellow magma of plumbic iodide was formed. This, after being washed and dried, fell short by about one-twelfth of the amount theoretically required. The powder was neither iridescent nor crystalline. When boiled with water the undissolved portion appeared unchanged. The solution gave a large residue of yellow crystals, which a half-inch power revealed as a beautiful collection of hexagonal plates and truncated pyramids. The ferrous acetate resulting from the reaction in which this iodide was formed, appeared to exercise no special solvent power, since the remarkable solubility of the powder in pure water was very striking. The presence of much acetic acid, however, considerably augments its solution. The simply aqueous solution gives with potassium iodide a faint, white flocculent precipitate. The addition of acetic acid to this mixture produces immediately a more abundant iridescent precipitate of plumbic iodide. The same result is obtained when the potassic salt is added after the acetic acid; an incomparably more intense iridescence results when the iodide of potassium is added in the solid form to the filtrate which contains the resulting ferrous acetate, together with the excess of plumbic acetate and the dissolved plumbic iodide. The profuse precipitate of plumbic iodide, when stirred about in the liquid, forms satiny wavy striæ, having a deceptive crystalline aspect. Under the microscope, however, even with a quarter-inch power and higher eye-pieces, the precipitate is amorphous. The results would indicate that plumbic iodide can assume three characteristic states, namely, an extraordinary amorphous and rather soluble form; an ordinary amorphous, and a crystalline form. Whether the iridescent precipitate represents still another distinct form, or is only a mixture of the second and third, cannot be positively stated. The writer believes that the extraordinary amorphous iodide is the proper medicinal salt. The following formula represents its production. The dissolved portion may, however, be separately secured in the ordinary form by the addition of acetic acid and excess of potassic iodide :—

Iron in fine wire	240 grains
Iodine	508 „
Plumbic acetate	757 „
Acetic acid,	
Water	of each sufficient.

Upon the iron wire pour 3 fluid ounces of water, add the iodine and shake the mixture at frequent intervals until the iodine is all combined, and a light green solution has resulted. In case the iron wire is extremely fine add the iodine in separate portions, shaking the mixture each time until the iodine colour is discharged. Pass the solution through a plain filter and follow with water until the whole filtrate measures 8 fluid ounces. Powder the plumbic acetate, dissolve it in 4 fluid ounces of water, and add acetic acid, drop by drop, until the solution becomes limpid. Pass the solution through a plain filter and follow with water until the filtrate measures 8 fluid ounces. Now pour this solution into the ferrous iodide solution, collect the yellow magma on a plain filter, wash it with water and dry the powder in the open air.

Mercuric Iodide.—This salt appears in at least three peculiar states of aggregation. A white extraordinary amorphous salt, usually having but a transient existence, almost invariably precedes the generation of the red ordinary amorphous salt. This latter compound is the U.S.P. official form and its preparation offers no special difficulties. A crystalline variety is most readily obtained by dissolving the official salt in a hot concentrated solution of sodium chloride or ammonium chloride and letting the liquor cool. The U.S.P. states that the official salt is a crystalline powder. That the product as officially prepared is largely contaminated by the crystalline form cannot be doubted. Such must result from the order of mixing the solutions as officially directed. In this process the first portion formed will naturally dissolve in the excess of potassic iodide, and subsequently separate in crystals as the remainder of the chloride is added. The U.S. Pharmacopœia also states that the iodide is soluble in solutions of mercuric chloride. This result is also insisted on in various text-books. It is, however, an exaggeration, to say the least, since the addition of only a few drops of the iodide solution causes a permanent precipitate with the whole volume of the chloride solution. A great advantage results from dissolving the mercuric chloride by means of sodium or ammonium chloride. There is also an advantage in the use of ferrous iodide. When a solution of ferrous iodide is poured into an excess of mercuric chloride solution containing sodium chloride, the ordinary amorphous mercuric iodide results. But in this case a considerable proportion of the iodide is retained in solution by means of an excess of mercuric chloride. The addition of potassic iodide to the filtrate gives an abundant precipitate, which exhibits itself in pearly streaks, similar to plumbic iodide under the same conditions. But it rapidly becomes flocculent and ultimately deposits more compactly. With a half-inch power this precipitate is seen to be composed almost entirely of prismatic needles. The writer believes that an amorphous mercuric iodide is the appropriate medicinal form. The following process is suggested to obtain such a product :—

Iron in fine wire	240 grains.
Iodine	508 „
Mercuric chloride	541 „
Sodium chloride	240 „
Water, sufficient.	

Pour 3 fluid ounces of water on the iron wire, add the iodine at intervals, if necessary, shake the mixture occasionally until the brown colour is discharged, and pass the light green solution of ferrous iodide through a plain filter. Then follow with water until the whole filtrate measures 8 fluid ounces. Powder the mercuric chloride, add the sodium chloride, and pour on 4 fluid ounces of water, stir the mixture until the salts are dissolved, and pass the solution through a plain filter, adding water

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until the whole filtrate measures 8 fluid ounces. Now gradually pour the iron solution into this, stirring the mixture meanwhile. Let the precipitate subside, and decant the supernatant liquor. Wash the residuary precipitate three or four times in succession, each time with 6 to 8 fluid ounces of water, then pour it into a plain filter, and expose the drained precipitate in the open air to dry.

Mercurous Iodide.—It is very difficult to prepare this salt in a suitable medicinal form, although the official process gives no such indication; but the process of the U.S. Pharmacopœia does not yield a desirable product. Elsewhere, November, 1884, the writer suggested a method for preparing mercurous iodide by double decomposition between potassio-mercuric iodide and mercurous chloride. The method is founded on a correct principle, but the practical difficulties presented by the rather coarse crystalline structure of commercial calomel interfere with a necessarily complete interchange of elements. Fownes's 'Chemistry' states that mercurous oxide is readily obtained by treating calomel with solution of potash. The writer, however, found that the structural character also prevents a thorough decomposition in this case. No less than half a dozen repetitions of the process of treatment with potash and nitric acid will suffice for the practically complete conversion of the calomel into mercurous nitrate.

In either case the generated iodide or oxide surrounds the impervious calomel fragments, and thus terminates the progress of the reaction. The Pharmacopœia states that calomel is an impalpable powder. The writer finds that the English calomel, which is alleged to be superior to other kinds, feels decidedly granular, and with a half-inch power exhibits a large proportion of transparent crystalline particles. That such must be the case becomes evident from the fact that sublimed calomel has a crystalline structure, and hence any degree of attrition, however extreme, cannot conceal the nature of its pedigree. When precipitated calomel, which is usually amorphous, is employed under these circumstances, perfect double decomposition results, owing to the pervious character of the molecular aggregation. It seems that the only practically available source of amorphously precipitated calomel is mercurous nitrate. This salt is itself rather difficult to prepare in a pure state and of definite composition. Its composition is variously given as $HgNO_3Aq$, and $HgNO_3$. The writer prefers employing it in proportion to the molecular weight of the latter formula, as then no objectional excess would result were it after all composed in this manner.

Mercurous nitrate is prepared by the rather tedious process of dissolving mercury in an excess of moderately dilute nitric acid. It then forms in crystals which decompose in pure water, but readily dissolve in water very slightly acidified with nitric acid. Doubtless a definite amount of freshly precipitated amorphous mercurous chloride prepared by any convenient method would be equally suitable in place of the mercurous nitrate of the following formula :—

Mercuric chloride	68 grains.
Mercurous nitrate	262 „
Potassium iodide	166 „
Sodium chloride	500 „
Nitric acid diluted,	
Water	of each sufficient.

Mix the mercuric chloride, sodium chloride and potassium iodide and stir the mixture with sufficient water, gradually added, until the salts are all dissolved. Pass this solution through a plain filter and follow with water until the whole filtrate measures 6 fluid ounces. Powder the mercurous nitrate, add 4 fluid ounces of water and sufficient diluted nitric acid, drop by drop, until, with constant stirring, a clear solution is obtained. Warm the first solution and gradually add the second whilst stirring the mixture, or mix the two solutions first and then heat the mixture. When, after sufficient warming, the bright yellow precipitate has firmly subsided, decant the supernatant liquor. Mix the residuary mercurous iodide with 4 to 6 fluid ounces of water, pour the mixture into a plain filter and thoroughly wash the precipitate with sufficient water. Finally dry the powder by exposure, but shielded from strong daylight.

Bismuth-oxyl Iodide.—The so-called sub-iodide or oxy-iodide of bismuth is attracting some attention. Some difficulties are encountered in the production of a definite salt, having a proper form and appearance. It has been ascertained that the substance should have the composition BiOI, and that it should be an amorphous powder of a light brick-red colour. The product usually obtained, although having the desired physical character, is always slightly in excess of the theoretical amount. The excess is about sufficient, in case it were water, to give the body the formula $BiOI.Aq$, or $Bi(OH)_2I$. If, however, exposed to a water-bath heat for many hours, it does not lose appreciably in weight. This, however, is no serious evidence against the presence of the elements of water in some state of combination. But the preponderance of evidence seems to indicate that the bismuth-oxyl nitrate has the formula $BiONO_3$ and not $BiONO_3Aq$, according to the U.S. Pharmacopœia. It is officially stated to be a heavy, white powder, nothing being said about its more intimate physical structure. When a specimen of one of the most reliable articles in the market is examined under a half-inch power it is found to be wholly made of stunted needle-shaped crystals. This condition is also possessed by the salt resulting from the writer's process elsewhere published in September, 1884. The success of this method led the writer to apply it in the preparation of the bismuth-oxyl iodide. The peculiar feature of the process consists in generating the oxy-salt in a decreasingly acid mixture, through the agency of calcium carbonate. When a solution of bismuth nitrate is treated with potassium iodide, either in substance or solution, a seemingly black and bulky bismuth iodide is precipitated. By adding calcium carbonate to a mixture of 1 m. of BiI_3 and 2 ms. of $Bi(NO_3)_3$ the brick-red BiOI results according to the following equation.

$$BiI_3+2(Bi(NO_3)_3+3(CaCO_3)=3(BiOI)+3(Ca(NO_3)_2+3CO_2.$$

The presence of acetic acid exerts no solvent power, but appears to be useful, if not essential to the process. The calcium carbonate is not added to total neutrality, but merely in sufficiency to convert the nitric acid into calcium nitrate. The first addition of the carbonate causes a yellow precipitate, which becomes more and more red with successive additions of the carbonate. When finally all the nitric acid is neutralized the brick-red compound permanently remains. Based upon these conditions, the following process is suggested :—

Bismuth-oxyl nitrate	288 grains.
Potassium iodide	166 „
Calcium carbonate	200 „
Nitric acid	360 „
Acetic acid	2 fluid ounces.
Water sufficient.	

Mix the nitric acid with 2 fluid drachms of water, and gradually add the bismuth-oxyl nitrate. To the crystalline mass which has resulted, add the acetic acid, and stir the mixture until perfect solution has resulted. Dissolve the potassium iodide in 2 fluid ounces of water, and pour the solution into the previous one. To the black mixture add gradually the calcium carbonate. When the reaction is completed, incorporate 2 fluid ounces of water and decant the supernatant liquor after the red precipitate has subsided; to this residue add 2 fluid ounces of water, pour the mixture into a plain filter, and after having thoroughly washed the powder, expose it in the air until perfectly dry.

It seems not inappropriate here to remark that bismuth pentoxide or bismuthic anhydrate might perhaps possess antiseptic properties of some medicinal value. The compound is easily prepared as a red-brown powder, by treating bismuth-oxyl nitrate with excess of solution of chlorinated soda and washing the precipitate with dilute nitric acid. In this connection, the writer would also

state that the bismuth when present in solution in very small proportion is readily reduced to the metallic state by a large excess of an ammoniacal solution of ferrous citrate. The reduction takes place in the cold, but is facilitated by heat.

When the black bismuth iodide is mixed with solution of potassium citrate a purple-red precipitate remains, and acidic potassio-bismuth citrate is dissolved. On setting the liquor aside, the acid salt separates in seemingly crystalline crusts. This residue, when treated with water, again dissolves, but meanwhile gives a mixture which on stirring, exhibits the striking pearly streaks already mentioned in connection with other salts. Under the microscope, however, no crystals are visible, but an abundant amorphous matter.

CARLSBAD.*

BY HORATIO R. BIGELOW, M.D.

It appears at first sight a work of supererogation to add to that which is already of record, touching upon Carlsbad and upon disordered livers generally. Yet it seems to me that this little Bohemian village is far too little appreciated, and what has been said about it, and what has been written in its praise, have not exhausted the subject in any perceptible degree; they have only whetted the appetite, as it were, for more.

The Springs of Carlsbad.

Name.	Temperature. R. °	F. °
1. The Sprudel	59·5	166
2. Hygiea-Quelle		
3. New Hygiea-Quelle		
4. Bernhardsbrunn	53	150
5. Curhausquelle	52	147
6. Neubrunn	50	143
7. Felsenquelle	48	138
8. Theresienbrunn	48	138
9. Mühlbrunn	45	133
10. Schlossbrunn	43·5	126
11. Marktbrunn	40	122
12. Kaiserbrunn	39	120
13. Elisabethquelle	37·6	116
14. Hochbergerquelle	33	106
15. Kaiser-Karl-Quelle	31	101
16. Russische Kronquelle	29	96
17. Sprudelsäuerling	23	85

The Commissioners of the Government, after a series of very careful analyses, demonstrated 41–42 of solid constituents in 1 pound (16 ounces) of Carlsbad water. Professor Ragsky, in 1863, made the following analysis:—

Solid constituents contained in 16 fluid ounces.	Sprudel.	Mühl-brunn.	Schloss-brunn.
Sulphate of potash	1·2564	1·7172	4·4645
Sulphate of soda	18·2160	17·9610	17·2455
Chloride of sodium	7·9156	7·8690	7·5282
Carbonate of soda	10·4593	10·8679	9·5620
Carbonate of lime	2·2870	2·0236	3·0658
Carbonate of magnesia	0·9532	0·2641	0·3870
Carbonate of protoxide of iron	0·0215	0·0230	0·0176
Carbonate of protoxide of manganese	0·0046	0·0053	0·0053
Carbonate of strontia	0·0061	0·0069	0·0046
Phosphate of aluminum.	0 0030	0·0025	0·0023
Phosphate of lime	0·0015	0·0016	0·0030
Fluoride of potassium	0·0276	0·0268	0·0291
Siliceous earth	0·5590	0·6190	0·7365
Total of solid constituents	41·7090	41·3870	40·1523
Free carbonate acid in grains in cubic inches	5·8670	7·3260	10·2940
	11·8820	14·8370	20·6200

* Extract from a ommunication to the *Boston Medical and Surgical Journal*, Aug. 11.

and Ludwig, of Vienna, in 1879, published this analysis made by himself:—

10,000 grams of the water contain	Sprudel.	Mühl-brunn.	Schloss-brunn.
Carbonate of protoxide of iron	0·030	0·028	0·001
Carbonate of protoxide of manganese	0·002	traces	traces
Carbonate of magnesia	1·665	1·613	1·615
Carbonate of lime	3 214	3·266	3·337
Carbonate of soda	12·980	12·790	12·279
Carbonate of strontia	0·004	0 004	0 004
Carbonate of lithia	0·123	0·118	0·136
Sulphate of potash	0·862	1·188	1·230
Sulphate of soda	24·053	23·911	23·158
Chloride of sodium	10·418	10·288	10·047
Fluoride of potassium	0·051	0·046	0 046
Borate of soda	0·040	0·029	0·039
Phosphate of lime	0·007	0·009	0·004
Silicecus earth	0·004	0·005	0·005
Silicic acid—anhydrate	0·715	0 735	0·703
Calcium, rubidium, bromine, iodine, arsenic, antimony, zinc, selen, thallium, formic acid	traces	traces	traces
Total of solid constituents	55·168	54·730	53·304
Carbonic acid, half combined	7·761	7·672	7·593
Carbonic acid, free	1·898	5 169	5·822

Small quantities of iodide of sodium, bromide of sodium, lithia, boracic acid, rubidium and calcium, are also found. All the surface waters of the Carlsbad region, including the river Tepl, penetrate the granite rocks and soil to great depths. They do this the more easily, owing to the disintegrated character of the granite formation. Carlsbad lies in what must have been a volcanic region. The geological formations, and the peculiar conformation of the land, all point to this conclusion. It would require no imaginative deduction to relegate the present site of this town to the crater of an extinct volcano, or if not so, we should not be far amiss in asserting that it rested upon volcanic *débris*, thrown down by a volcano which has been extinct for ages. In its downward course this surface water becomes impregnated with the granite constituents, which Göttl has shown to be soda, lime, potash, siliceous earth, aluminum, magnesia, iron, manganese, arsenic, chlorine, fluorine, sulphur, sulphuric and phosphoric acid. From the soil, it becomes heavily charged with carbonic acid. Owing to the action of this acid, and a counter atmospheric pressure, it dissolves, both by chemical and physical action, the solid mineral and extracts the salts, which are held in solution by carbonic acid gas. Knowing that the temperature increases, as we go down into the earth, and having learned exactly in just what ratio such increase occurs, it is not difficult to locate the depth of the basin which supplies the springs beneath the earth's surface. This is estimated to be 8000 feet. As all of the Carlsbad springs contain almost identically the same ingredients, they must have one reservoir in common. The difference in temperature of course is due to the length of time taken to reach the surface. The spring which takes the most direct route, will manifest itself first, and will be the hottest. The heat which the surface waters draw from the strata in their descent, sets free the carbonic acid gas, and it is this strongly propelling force which forces them back as spouting springs. The whole face of the country, the nature of the springs, the intermittent character of the supply, and the influence of earthquakes and active volcanoes at a great distance upon the amount of the water, seem to point to volcanic origin beyond all question of a reasonable doubt. Eidmann and Göttl found

electro-magnetic currents (negative) in some of the warmer springs—a fact without much significance, when we remember the constituents of the water. The bicarbonates, which are held in solution by the carbonic acid, become precipitated by exposure to the air, and encrust, with beautiful effect, everything with which they come in contact. The solid constituents of each spring are *about* the same. They all belong to the saline alkaline springs, and are like the "Glauber's salt waters" of Stubnya and Beitrich. Sulphate of soda, carbonate of soda and chloride of sodium are the chief ingredients. These of themselves are not wonderful as remedial agents. Anyone can make an artificial solution at home, or can take the bottled imported water, or a dose of glauber's salt, or Dr. Kinnicutt's formula of 50 parts of sulphate of soda, 20 parts of bicarbonate of soda, and 10 parts of chloride of sodium, or sulphate of soda with sulphate of magnesia in Apollinaris water, as recommended by Jacobi, but the "Carlsbad Kur" will not follow any such line of treatment. It is not the glauber's salt alone, it is not the carbonic acid gas alone, it is not the temperature alone, it is not the diet and the exercise alone, but it is a combination of all under the direction of an intelligent physician which effects the results that have made Carlsbad so celebrated. A patient who is so determined upon getting well as to make the journey here will, ten chances to one, more religiously conform himself to doctor's orders than he ever did at home. There is, too, potentiality for good, in these waters taken at their natural temperature, with their proper admixture of carbonic acid. A potentiality which no imitation can possibly obtain, and which even the bottled waters will fail to accomplish. Chemical combinations become changed, not only in their molecular formation, but in their therapeutic action, by the action of heat. Clinical evidence of this can be had here daily. Proof also is not wanting that cases which in America, under the most intelligent handling and favourable circumstances, failed to respond to a therapeutical system based upon a knowledge of the ingredients of the Carlsbad waters, rebound, as if by magic, first to convalescence, and then to restored health, after a four or six weeks' course at Carlsbad. I have heard that an attempt will be made to establish a "Karlsbad Kur" at Atlantic City. I predict its failure. It is simply impossible to reproduce the waters.

ANALYSIS OF CIDER OR APPLE VINEGAR.*

BY B. F. DAVENPORT.

The following detailed practical method of determining whether a sample of "cider vinegar or apple vinegar" conforms to the requirements of the Massachusetts statute relating thereto, which requires that it should be not only the legitimate and exclusive product of pure apple juice or cider, but also that it should not fall below the quality of possessing an acidity equivalent to the presence of not less than 4½ per cent. by weight of absolute, that is monohydrated, acetic acid, and should yield upon full evaporation at the temperature of boiling water not less than 2 per cent. by weight of cider vinegar solids, may prove of interest to those dealing in the article. As the limits set by the statute are in per cents. by weight, the portion of vinegar taken for the tests should, for perfect accuracy, be also taken by weight, that is the quantities of 6 and of 10 grams are to be taken for the tests of strength and of residue, but as taking it by measure, if of about the ordinary atmospheric temperature of 60° to 70° F., will make the apparent percentage at most only 1 to 2 per cent. of itself greater than the true, that is, will make a true 5 per cent. vinegar appear to be, say, from 5·05 to 5·10 per cent., measuring proves in practice to be accurate enough for all common commercial purposes, and therefore the quantities of 6 and of 10 cubic centimetres by measure may be taken in place of as many grams.

It is most convenient to have the measuring burette of a size to contain 25 to 50 c.c., that is cubic centimetres, and have these divided into tenths. The best form of burette is the Mohr's, which is closed by a glass stop-cock. Besides this only a dropping-tube, called a pipette, graduated to deliver 6 and 10 c.c., will be needed.

The only two chemicals needed in determining the strength of a vinegar are a 1 per cent. solution of phenolphthalein in diluted alcohol, and a sufficient quantity of the volumetric solution of soda.

Having these, the procedure for making the test will be as follows:—Fill the pipette by suction and then quickly close the top of it with the forefinger. Raise the tube out of the sample of vinegar and let it empty out by drops exactly down to the top graduation mark, this bearing the mark of 0 c.c. Then holding it over a white mug or cup let it run out exactly down to the 6 c.c. mark. Dilute the 6 c.c. of vinegar, thus measured out into the mug, with sufficient clean water to make it look about white, and then add to it about three drops of the phenolphthalein solution. Then having prepared the burette by filling it up to the top, zero, or any other noted mark of the graduation, with the volumetric solution of soda, let the soda solution run out cautiously into the diluted vinegar, which should be constantly stirred about. As soon as the vinegar in the mug begins to darken the soda should then only be allowed to run into it by drops. This dropping is thus continued until at last a final drop of soda turns the vinegar suddenly to a permanent pink or cherry colour, which will not disappear upon further stirring. By now reading off from the graduations of the burette the number of full c.c. divisions and of tenths which have been emptied out to bring about this change of colour in the vinegar is known the per cents. and tenths of acidity equivalent to true acetic acid contained in the vinegar being examined. This, if it is a pure cider vinegar and well made, will be upon the average about 6 per cent., but never under 5 per cent. If in like manner 10 c.c. of the vinegar is exactly measured off by the pipette into a small light porcelain dish, and then evaporated fully to dryness over boiling water, the number of grams weight gained by the dish, when multiplied by ten, gives the percentage of solid residue contained in the vinegar.

There are certain characteristics peculiar to the residue of a pure cider vinegar, the principal of which are the following:—It will be about 3 per cent. in weight, and never less than 2 per cent. It is always soft, viscid, of apple flavour, somewhat acid and astringent in taste. A drop of it taken up in a clean loop of platinum or of iron wire and ignited in a colourless Bunsen gas lamp flame, imparts to it the pale lilac colour of a pure potash salt, without any yellow due to sodium being visible. The ignited residue left in the loop of wire will be a fusible bead of quite a good size, and it will leave a strong alkaline reaction upon moistened test-paper, effervescing briskly when immersed in an acid. The presence in a vinegar of the slightest trace of any free mineral acid will prevent the ignited residue leaving any alkaline reaction, or effervescing with acids. The presence of any practical amount of commercial acetic acid added to "tone up" the strength of the vinegar will cause the igniting residue to impart another colour to the Bunsen flame, and the residue itself will have a smoky pyroligneous taste or odour. Any corn glucose used in the vinegar will cause its residue when ignited to emit the characteristic odour of burning corn, and as the last spark glows through the carbonized mass to usually emit the familiar garlic odour of arsenic, for the common oil of vitriol usually used in the production of glucose is now mostly derived from pyrites, which almost always contain arsenic. A glucose vinegar which has been made without vapourizing the alcohol after the fermentation of the glucose will also have a strong reducing action upon a copper salt in an alkaline solution, and also will give a heavy precipitation of lime with ammonium oxalate. A true malt vinegar always contains phosphates, and a wine vinegar cream of

* From the *Chemical News*, July 8.

tartar. The presence of any acrid vegetable substance in a vinegar is known by the residue having a pungent taste, especially if before the evaporation the vinegar has been exactly neutralized with soda.

In a pure apple cider vinegar hydrogen sulphide gas will not cause any discoloration, nor will the addition of a solution of either barium nitrate, silver nitrate, or ammonium oxalate cause anything more than the very slightest perceptible turbidity. But the addition of some solution of lead acetate—that is, of sugar of lead—will cause an immediate voluminous and flocculent precipitation, which will all settle out in about ten minutes, leaving a clear fluid above. In most of the so-called "apple vinegars" brought into this market from other States the addition of some of this lead solution will cause but a slight turbidity, without any precipitate settling out for several hours, and even then the precipitate will not be of the same appearance as in apple cider vinegar.

JAPANESE DRUG STORES OF THE PRESENT TIME.*

BY MASATO KAWAMURA.

There are two kinds of drug stores in Japan. One we call eastern style, or Chinese style, but quite different from those of China, though they bear such name, because they keep principally vegetable and animal drugs, which are chiefly used by old-fashioned physicians; at present they also keep crude drugs and chemicals, though the latter are but few in number. For instance we can get quinine, morphine, bromide and iodide of potassium and similar leading chemicals. Such well-known substances can be purchased even in country drug stores, but they do not keep every kind of chemical which an American drug store would have, and we can say that they are quite ignorant of many kinds of Western chemicals.

It was the custom of Japanese physicians to have their own prescription room in their own house, and they did not charge a fee for the examination of patients, but for the medicine. So the old-fashioned drug stores have not been accustomed to prepare prescriptions of other physicians.

In this kind of drug store patent or proprietary medicines, pills, ointments and many kinds of perfumes, tooth powder, etc., are sold. Occasionally they put up prescriptions, but this is a rare case, as the physician usually does not send his prescriptions to such drug stores, because they patronize their own prescription room. So the old-fashioned drug store simply supplies medicines for physicians (it seems to me they are just about the same as retail houses in the United States). They have some knowledge about the dispensing of old-fashioned medicinal articles, which they received from their ancestors, or have learned some knowledge of medicines from the physicians, so they can give medicines for patients who cannot or will not go to the doctor. For instance, if any person who has a headache or toothache, etc., goes to a drug store for relief they have some patent medicine for every kind of disease, or very simple remedies, and give it to the patient. But they do not give any further treatment for the patient beyond simple remedies.

In the old-fashioned drug store there are generally from five to eight employees, and the larger stores employ more than that. Some of these are used to solicit orders from the physician, and they are accustomed to call upon the physicians at their offices in the morning to ask their orders, while the others remain in the store as salesmen of goods, etc. The young men are required to study while they are in the store, in their leisure moments, dividing the time between business matters and elements of medicine during some years of the service. When their terms of apprenticeship have expired they serve as advanced clerks in the store.

The appearance of this kind of drug store can be as easily distinguished from other stores as they are in the United States. There they hang a very large bright mortar in the front of the store entrance, but in Japan they hang a big bag, which is beautifully painted, over the entrance, or put it in the front door; others, again, hang up the back of a large tortoise. However, the majority use as their symbol the bag; as I can see in America, the majority use a mortar. The reason they use the bag in Japan is because there the vegetable or animal drugs are usually sold in paper bags instead of bottles or any other containers, which is the American custom. They did not use any kind of bottles or tin cans in the old time, but to some extent porcelain vessels have been used for ointments and some kind of syrups or extracts, while at the same time many kinds of emptied sea shells and clam shells were used for holding ointments, as well as wooden boxes.

The interior view of the store is almost the same as an American one, but they have not so many ornamental bottles, as they do not keep as many chemical, but rather vegetable and animal drugs. These they arrange upon shelves and cases which are beautifully made with lacquer and etched with golden figures. On the upper part of the shelves there are many beautiful porcelain bottles or pots, which contain ointments, syrups, or mixtures, and are handsomely arranged, while the lower part contains cases which have many hundreds of drawers, in which the fine powders or pieces of vegetable drugs are kept. Near the ceiling of the store there are boards hung, which are beautifully lacquered and carved on both sides with Japanese letters, coated with silver or gold leaf. These boards are to show what kinds of patented medicines they have in their store for sale.

If I want to sell a certain preparation I must apply to the manufacturer, and when he consents he will send me the board to hang in my store, at the same time sending me the pills in quantity at the reduced rate.

In America drug stores seem to be situated on the corner of every street, but in Japan it is not on the corner, but at any other convenient place.

It was the custom in Japan in past times to inherit the ancestor's business, so all the stocks and customers left from their ancestors followed the inheritor. Some have a big stock, and some have large properties, and frequently drug stores seem very popular and prosperous. There is a proverb said by our people that "Medicines can get profit or gain nine times of its original value," so the drug business is said to be a profitable and honest business in Japan.

Though I am not so familiar with the old-fashioned style, yet I know, from the experience which I have had in my native country, considerable about some of the popular remedies, so I will describe a few formulæ which are used quite largely.

Some purgative pills are used quite largely:—

Rhubarb	2 parts
Gentian	1 part
Skull-cup	1 part

Make to finest powders and mix them thoroughly, then make the pills with rice or starch paste and divide into the required number (5-grain pills). These pills are put into a small paper bag from twenty to thirty in number. They cost about six or eight cents, and are sold to anyone. The formula in old-fashioned drug houses for a diaphoretic medicine is:—

	By weight.
Kak-kon (kind of root or vine from which starch is extracted, so it may be translated starch root)	℥iij
Hange (small white grain which is produced in China. I do not know the active principle, but it is known as a diaphoretic drug)	℥j
Cinnamon	℈j
Glycyrrhiza	℈j
Gentiana	℈j

These drugs to be cut into a size of small corn or rough powder. Boil them with about half a pint of water for

* From the *Pharmaceutical Record*, August.

half an hour until it measures 6 fluid ounces; then strain through linen or muslin. Take three times a day. This is considered to be a cure for cold and simple fever.

The above is only an illustration of a medical formula used by old-fashioned drug stores and physicians. However, they have many thousand formulæ for every kind of disease.

Crude drugs, which are used by old-fashioned physicians, are of many hundred kinds. Among some of them used in Western countries (I mean Europe and America) are cinnamon, rhubarb, glycyrrhiza, gentiana, menthol, ginseng, amygdala, etc., which have been used in Japan and China for hundreds of years.

In former times it was not necessary to be examined by the pharmaceutical or sanitary board in order to become qualified as a proprietor or qualified assistant, but in the present time (from about twelve years ago) candidates are required to undergo an examination for such positions on the following subjects :—Elements of chemistry, elements of natural philosophy, elements of botany, pharmacy, materia medica, arithmetic, prescription writing.

Of course, the examinations are from books translated into Japanese. Therefore, in the future, we shall seldom see the old-fashioned drug store in Japan, since medical science has made very rapid progress in our country through the influence of Western civilization in Japan.

What we call "Western style" differs from the style of an American drug store; so I call it an imitation of Western style, as it is the mixture of Japanese and European styles.

This kind of drug store differs considerably from that of the old-fashioned style, and the proprietors and assistants are the licentiates of the Board of Pharmacy or Sanitary Bureau of the Interior Department—that is, they have passed the examinations of the above mentioned branches. Connected with this kind of drug stores are many graduates of the College of Pharmacy of Tokio University. So I can call this kind of drug store quite complete and further advanced than the kind previously described. Most of the proprietors and employees are learned men in the art of pharmacy.

In this kind of drug store they keep every kind of chemical which is called for by the Pharmacopœia, and they can prepare prescriptions which are sent by physicians who were educated by Western civilization or even by foreigners. They do not keep so great a variety of vegetable and animal drugs, as do the former, but we can get any kind of medicinal chemicals that might be desired.

In the past there has been about as much trouble between physicians and druggists as there has been in America, because, as already mentioned, it was the custom for physicians to dispense their own prescriptions. This custom is likely to change, as the physicians who were educated in Germany, England and the United States are trying to send their prescriptions to the drug stores. Besides, our Government is going to join us in the effort to reform this old custom. Formerly the drug stores were identified with physicians; for instance, when a drug store was established the proprietor had his prescription rooms and store on the first floor, and the second story was occupied by the physicians who were connected with it. When the patient came to consult the physicians for disease the doctor examined the patient and directed him to take the prescription to the druggist down stairs; the doctor did not charge an examination fee, but he got his share from the drug store. I think this was a very convenient way for both, as the patient obtained the medicines and examinations at once. This was the fashion a few years ago, but at the present time many of the physicians are going to send their prescriptions to drug stores, and the doctor charges the examination fee just as an American does.

In this kind of drug store they use almost the same kind of bottles, though not so large (though some few are very large), and the medicines are quite the same as Europeans or Americans use. Chemicals are chiefly imported from England, Germany, France and America, as we have not so many manufactories in Japan. In the year 1885 the imported medicines and chemicals amounted to 1,194,309 dollars per year, and I believe at the present time it is over 3,000,000 dollars a year.

In this kind of drug store patent medicines, tooth powder, etc., are sold, and I can say almost the same as those in America. In some stores surgical instruments are sold, while in others fancy goods are sold alongside of drugs.

The employees of the latter drug stores have generally attended the College of Pharmacy, which was constructed at private expense, and is not connected with the University. The lectures on pharmacy and chemistry are given in the evening, and the students are obliged to prepare extracts, tinctures, syrups, ointments, etc., in the store. Those who graduate from this college course or pass the Board examinations are chiefly engaged in prescription duty.

The general appearance of this kind of store is quite similar to many of the drug stores I have seen in America. Heretofore the different pharmacopœias, British, German, or United States, have been in use, as we had none of our own until last year. The physicians who were educated in Germany or in the Tokio University generally used the German Pharmacopœia, while those who studied in England and the United States always used the British and United States Pharmacopœias, so we had no uniformity in preparations in the past. But in the future they ought to use the Japanese Pharmacopœia as a universal formulary. In the private college of pharmacy the teachers are chiefly Japanese, who use translated text-books; for instance, in chemistry they have Roscoe's 'Chemistry' and Fownes's 'Chemistry,' while in natural philosophy Ganot's and Deschanel's 'Philosophy' are already translated, as well as similar standard text-books. In pharmacy there are many text-books translated from German and English.

In the Department of Pharmacy of Tokio University there are two classes—one in the Japanese language, which takes a three years' course to graduate, and the other is in the German tongue, with professors generally from Germany. In this course it takes over four years to graduate. Those who graduate in this department are complete and accomplished pharmacists, and it seems as if this department required a higher standard than some American colleges of pharmacy, but this I cannot say positively, as it is only my own opinion.

Besides the two kinds above mentioned, there are other kinds of medical stores that sell only patent medicines, and have nothing to do with crude drugs, chemicals, prescriptions, etc. The number of these in 1885 in the Empire of Japan was 11,166, according to the statistics of the Japanese Government. There are of these old-fashioned drug stores 8095, and of graduates and those who have passed the examination of Boards 333. The former belong to the first kind of drug stores which I mentioned, and the latter belong to the second kind of drug stores which I call the more complete kind. In closing I will annex the statistics of physicians, hospitals, etc., in 1885.

Hospitals, 632; 10 of these belong to the Government, 357 belong to the public, and 265 are supported by private contributions. These may be classified according to their uses as follows :—Interior and surgical hospitals, 483; hospitals for syphilis, 125; hospitals for insane, 7; hospitals for leprosy, 3; hospitals for eye, 8; hospitals for dropsy of the legs, 4; hospitals for bones, 2. The physicians number 37,708, of whom 2974 are licensed by the Board of Medicine; graduates in the Tokio University and in foreign medical colleges, 584; those who are allowed to practise without examination, 3776; those who are allowed from the provincial board or district boards, 32,374.

The Pharmaceutical Journal.

SATURDAY, AUGUST 27, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ANNUAL REPORT OF THE INLAND REVENUE COMMISSIONERS.

THE annual report of the Commissioners of the Inland Revenue Department is generally interesting on account of the information incidentally afforded by it in regard to several important industries, and the report for the year ending March 31, 1887, which has just been issued, is no exception to the rule. Taking, in the first place, the excise duties, which amount in the aggregate to about twenty-five millions sterling, and constitute nearly one-half of the entire inland revenue of the United Kingdom, the most important factor is spirit. The revenue derived from this article amounts to nearly thirteen millions sterling, and it appears that the quantity charged with duty was 26,935,873 gallons, showing a decrease of 616,109 gallons as compared with the previous year. This falling off is less than it had been in the previous year, when the decrease was no less than 1,672,492 gallons, and it is to some extent to be accounted for by the further general reduction in the quantity consumed as a beverage which has been most marked in England, and very appreciable in Scotland, while in Ireland there has been a considerable increase in the consumption of spirit for this purpose. The production of spirit in the United Kingdom has also suffered considerable reduction, not quite so large as in the previous year, but still amounting to about one million and a quarter gallons, and although raw or malted grain is still the principal material employed for the purpose there has been a larger use of sugar than hitherto. The export of spirit to various countries, amounting in the aggregate to nearly three million gallons a year, has shown but little variation for the past six years. The use of methylated spirit for manufacturing purposes continues to increase, the total quantity for the United Kingdom having been last year 2,673,375 gallons, and an increase of 195,577 gallons on the previous year. By far the greater part of this has been used in England, the quantities consumed in Scotland and Ireland having been respectively only 448,372 gallons and 760 gallons. The quantity of spirit imported from abroad still continues to increase steadily, and last year it amounted to 1,409,324 gallons, or more than twenty per cent. in excess of the quantity imported during the preceding year. So far as the number of instances in which illicit distillation has been detected, it would appear that this has been on the increase, more especially, however, in Ireland, and this is attributed partly to the unsettled condition of the country, partly also to the very low price of grain, and to the consequent straitened circumstances of the small farmers and labourers.

The next large item of excise revenue is for beer duty, amounting to £8,495,654 sterling, and £92,073 in excess of the previous year. The total quantity of beer charged with duty has been 27,948,883 barrels, and the increase for the separate parts of the United Kingdom had been for England 2·44, for Scotland 6·98, and for Ireland 3·93 per cent. It appears that the number of brewers of beer for sale continues to decline, and as the occupiers of houses not exceeding the annual value of eight pounds have been exempted from beer licence duty by the Revenue Act of 1886, the number of licences issued to private brewers has fallen from upwards of 95,000 to about 33,600. The loss to the Revenue thus occasioned had been estimated at £16,000, but it has in fact amounted to only £14,830. The number of persons licensed to brew beer for domestic purposes has been very small both in Scotland and Ireland, only 714 licences having been granted for both parts of the Kingdom, while the number granted for England has been 32,867. In connection with this part of the report it may be mentioned that an important decision was given by the Queen's Bench Court last December in reference to the preparation of the article known as "botanic beer." According to that judgment, it was held to be an offence to sell any liquor found on analysis to contain more than two per cent. of proof spirit, if such liquor is sold under any name describing it as beer, whether it be sold as a substitute for beer or not.

The activity of the excise department in the prosecution of beer retailers for adulteration has been for some time past conspicuously evident in the daily papers, and it appears from the report just issued that the efforts made to stop the practices which have prevailed in London have been very successful. There have been no less than three hundred and fourteen prosecutions heard before Metropolitan Police Magistrates, with convictions in every case but one, the total amount of the fines imposed being £7,637. As there is often a great deal of nonsensical declamation about the adulteration of beer, it is satisfactory to find that the officers of the excise department have failed to discover any single instance in which deleterious materials had been made use of in the treatment to which beer had been subjected by retailers. It was found that the adulteration had always been confined to the admixture of water to increase the quantity, and of sugar to restore the fulness lost by the addition of water, so that, although a

fraud on the beer consumer and detrimental to the revenue, it was not open to the further objection of making the beer unwholesome. In connection with this matter it appears that 1999 samples of beer obtained from 1022 publicans have been analysed during the past year, so that the evi l n e as to the absence of ingredients injurious to health may be regarded as tolerably conclusive. The export of beer has somewhat fallen off during the past year, having amounted to 503,895 barrels as against 518,903 during the previous year. On the other hand, the import of beer from abroad has increased to 23,235 barrels as against 21,606 barrels during the previous year.

The third large item of excise revenue relates to various descriptions of licences. In the aggregate this amounts to about three and a half millions sterling. More than half of this is derived from licences for the sale of beer, wine and spirits; about one-fifth of it comes from licences for carriages, servants and armorial bearings; another tenth from dog licences; rather more than half as much from licences of Auctioneers, Appraisers, Pawnbrokers, Hawkers and Pedlars, and a somewhat larger amount from gun and game licences. Among the remaining items, the amount derived from the use of stills by chemists figures as £449, and that from patent medicine licences figures as £5,228. The other charge on account of patent medicines for stamps does not come under the head of excise. It amounts for last year to £179,508 as against £122,426 in the year 1878, the increase having gone on progressively meanwhile. The total revenue derived from the sale of patent medicines has been therefore £184,736 during the past year.

In the report of the Principal of the Chemical Laboratory attached to the excise department an account is given of the work done in cases of reference under the sale of Food and Drugs Act. During the year 45 samples have been examined under such conditions, comprising milk, pepper, butter, bread, coffee, whisky and ale. In 24 of these cases the results obtained were in confirmation of those reported by the local analysts, but in the other 21 cases this was not the case, so that it is evident there is considerable need for a check upon the action of public analysts by reference to an impartial and independent authority. It appears that the greater number of the samples consisted of milk; but there were also eleven samples of pepper, eight of which were alleged to contain an admixture of ground rice, though it was not present in any one of them. Of the remainder two contained an excessive amount of mineral matter, and the third was adulterated with the article known in the trade as "poivrette," which consists of ground fruit stones. This adulterant is prepared in Italy and is imported for the express purpose of mixing with pepper. Of three samples of butter, one was alleged to contain 60 per cent. of foreign fat, but it was found to be genuine butter. The other two, reported to contain an excessive amount of water and salt, were found to have no more of either than is often met with in some kinds of genuine dairy butter. In another case a sample of whisky that had been pronounced by the public analyst to be unduly diluted, was found to be actually above, instead of below, the minimum legal strength.

The utility of a chemical laboratory in connection with public departments which are intrusted with the spending of vast sums of public money seems to be gradually gaining recognition, if we may judge from the number of instances in which the services of the excise chemists are brought into requisition by the Admiralty, the Board of Trade, and the India Office. For the first-named department as many as two hundred and five samples have been analysed during the past year in the Somerset House laboratory. While some of these were of satisfactory quality and fit for the purpose they were intended for, several of them were defective, and as an illustration of the necessity for such examination of supplies obtained under contracts for public use the results obtained by the analysis of some electroplate may be mentioned. Out of 36 articles examined there were 26 in which the amount of silver deposited upon them fell short of the quantity contracted for, and in one instance a teaspoon which should have been coated with 42 grains of silver was found to have less than one grain. The articles examined for the Board of Trade have been principally lime juice and rum, disinfectants, etc. Those examined for the India Office have been of a more miscellaneous nature, but the results show the practical importance of applying the test of chemical analysis for ascertaining the nature and controlling the quality of articles in commercial transactions.

BRITISH PHARMACEUTICAL CONFERENCE.

THE following additional list of titles of papers received for the Manchester Meeting of Conference has been forwarded to us by the Honorary Secretaries:—

19. "Strophanthus and Strophanthin," by W. ELBORNE.
20. "A Spurious Cubeb," by W. KIRKBY, F.R.M.S.
21. "Note on Camphor Oil," by P. MACEWAN, F.C.S.
22. "Notes on Strophanthus," by W. L. SCOTT.
23. "On Cali Beans and their probable Uses in Pharmacy," by W. LASCELLES SCOTT.
24. "On the Siegesbeckia Orientalis and the Organic Principle contained therein," by W. LASCELLES-SCOTT.
25. "Pharmaceutical Notes on Some Synthetical Compounds recently introduced into Medicine," by H. HELBING.
26. "Some Fundamental Errors in the Pharmacopœia," by C. R. C. TICHBORNE, LL.D., F.I.C., L.A.H.I.
27. "On Mackay Bean," by JOHN MOSS, F.I.C., F.C.S.

On p. 183 will be found the promised statement of the income and expenditure of the Chemists and Druggists' Trade Association, from the date of the last published account to the termination of the Association. It shows that the members of the Committee have been called upon to contribute the sum of £34 4*s.* 11*d.* to make up a deficiency.

Chemists and Druggists' Trade Association of Great Britain.

INCOME AND EXPENDITURE ACCOUNT FROM APRIL 18 TO AUGUST 18, 1887.

Receipts.

	£ s. d.	£ s. d.
Balance brought forward from last Account, viz.:		
Balance at Lloyds, Barnetts and Bosanquets' Bank, Limited	286 15 4	
Ditto in hands of Secretary	16 0 6	
		302 15 10
102 Subscriptions at 5s.		25 10 0
Donations		4 15 6
Midland Counties Chemists' Association, 3 quarters' rent		3 15 0
Proceeds sale of furniture, less commission and expenses		5 2 0
Cheque unpresented since 1880		0 6 0
Contributions by Committee to make up deficiency		34 4 11
		£376 9 3

Payments.

	£ s. d.	£ s. d.
Advertisements		14 5 0
Auditors' Charges from April 15, 1886		21 0 0
Canvassing Expenses		0 10 9
Hire of Rooms for Public Meetings		3 13 6
Law Costs, viz.:—		
Solicitors' Charges	10 6 2	
Ditto Travelling Expenses	2 5 9	
		12 11 11
Office Expenses, viz.:—		
Cleaning	0 7 0	
Gas	1 15 11	
Rates and Taxes	4 15 4	
Rent	12 2 8	
		19 0 11
Postages		62 10 10
Reporting		20 4 4
Salaries, viz.:—		
Secretary	50 0 0	
Assistant Secretary	35 0 0	
Clerk	6 7 0	
		91 7 0
Stationery and Printing		37 0 0
Sundries		8 9 0
Travelling Expenses, viz.:—		
Executive Committee	74 7 0	
Secretary	11 9 0	
		85 16 0
		£376 9 3

We have examined the foregoing account with the books and vouchers of the Association and find it correct,

LAUNDY AND CO., Chartered Accountants, Auditors.

Birmingham, August 18, 1887.

British Medical Association.

PROGRESS OF THERAPEUTICS.

BY WILLIAM WHITLA, M.D.

The following passages are taken from an Address on the Progress of Therapeutics, delivered by Dr. William Whitla, as President of the Section of Pharmacology and Therapeutics, at the recent meeting of the British Medical Association in Dublin:—

Pharmacology, in the present accepted meaning of the term, deals exclusively with the actions of the various remedial agents in health altogether independent of disease; whilst therapeutics, it is needless to say, embraces the consideration of the practical application of remedies to the treatment of disease. Speaking in a general sense to-day, one might regard the first as a science dealing with the results of experimental researches upon the lower animals, and the second as the science which applies these experimental results to the relief of suffering and disease in man, always, of course, remembering that there was a therapeutics before the science of pharmacology was dreamt of. There is perhaps no sadder aspect of scientific medicine in this country than the present position of pharmacology. The restrictions imposed by a short-sighted Legislature, warped and swayed in its judgment by noisy and clamorous agitators, have driven us into the humiliating position of looking to the more favoured investigators in other countries for those solid materials out of which, to a large extent, we must rear a truly scientific treatment of disease.

It is not my intention to dwell upon this said grievance, but in the brief period at my disposal to look away from it and take a rapid glance at our position from rather an opposite standpoint. It is easy, by dwelling upon the thought of how we are handicapped in experimental researches upon the lower animals, to foster a sullen or slothful inaction, which in time might become a paralysis, and it appears already that signs of such inaction are not wanting. Too much is expected from pharmacology, and many of those who chafe and fret under the difficulties of carrying out investigations of this sort, and who lament the dearth of laboratories and appliances in our great teaching institutions, have got to believe that if only such restrictions and difficulties were removed, and every school had its pharmacological laboratory, the millenium would at once arrive. If we could fancy every obstacle removed, and every conceivable facility given for the prosecution of such research, the practical physician would not find the way to a better treatment of disease made easier for a long time to come. The results of pharmacological labour are often of very little value until elaborated, tested, and purified from their dross at the bedside by patient and repeated clinical observation. The real work sometimes only begins when the pharmacologist leaves off. It is perhaps as well for the science of medicine that, after all, in the most favourable view of the case, few men can be expected to devote themselves exclusively in this country to the study of the action of remedial agents and substances upon healthy organisms, otherwise the treatment of disease might soon become utter chaos, as years of careful clinical observation and experience are often needed for the laying down of correct rules by the practical physician or therapeutist before the discovery of the pharmacologist can be of much value. Indeed, at the present moment, though we justly mourn over the paucity of pharmacological material, there is evidence that in many directions it is far in advance of our therapeutics.

Strophanthus, digitalis, caffeine, convallaria, adonis vernalis, scillin, casca, ordeal bark, mistletoe, and many other active vegetable substances have been found to produce certain definite and similar effects upon the healthy heart. What a vast field of clinical experience, and what innumerable observations by hosts of patient observers must be recorded before the physician can expect even to know which of these remedies is the most valuable, and under what conditions certain members of the group are indicated, whilst others are forbidden in

the treatment of the diseased organ. This is true of the great bulk of our new drugs. We are only familiar with their most evident and striking actions, and we cannot expect for years to really know all we should about them, till innumerable observations at the bed-side reveal to us their value in the ever-varying conditions of diseased processes. The most sanguine view of our present position, and the rate at which we are progressing, must convince us that as practising physicians we might be doing more in the direction of applying, utilizing, and perfecting the results of recent pharmacological discoveries.

In the search after "new remedies" and specifics we have obtained a number of valuable drugs about whose virtues there is much yet to learn, and the scientific practitioner, who is simply waiting and watching for new additions, and deploring his own inability to add to the list, is losing the opportunity of improving the science to whose advancement he has consecrated his life and energies. The indication at present is not for more new remedies, but for a better and more precise knowledge of those already placed in our hands. It seems as if one of our very greatest barriers to progress is to be found in the ever-increasing number of new drugs which pour in upon us at a rate which prevents that thorough testing of their qualities and actions so necessary before the range of the new weapons can be accurately determined.

Here then seems to me to be our duty as a Section. A vast field of almost virgin soil lies at our feet: pathology, chemistry, physiology, pharmacology, and pharmacy, have brought in their discoveries and enriched the domain of therapeutics, and if we are to reap the benefits we must be up and doing.

The higher and perhaps more strictly scientific work of the pharmacologist must, as a rule, be wrought out by himself in the solitude of his own laboratory, as he watches and records the comparatively constant effects of agents upon the tolerably stable conditions of health. The therapeutist, upon the other hand, requires the assistance of innumerable observers whilst studying the effects of the same agent upon the restless moods of endless change in the ever-varying conditions of disease in different individuals. One might state this in a general sort of way, by saying that the advance of pharmacology can only be accomplished by individual effort, whilst therapeutic advance demands combined and co-operative assistance. With the smooth working machinery of the British Medical Association, the principle of co-operation can be easily and effectually brought into action. At the present time there are many deterring forces operating to prevent a man from making or publishing the results of observations upon the action of remedial substances in disease. The fashion of the hour is to depreciate any records which do not appear susceptible of mathematical proof. The results of clinical experiences of various treatments are too often regarded as "matter" which can have no pretence to originality, and one can hardly fail to observe the prominence which many medical writers give to experimental researches of the most superficial and fallacious kind, which are at variance with the patiently accumulated clinical experiences of centuries. The feeling often presents itself to the physician that no matter how large may be his field of private or hospital practice, it must be too limited to enable him to formulate rules even for his own guidance about the use of many substances which are daily being employed in medicine. The immense number of such substances in constant use, about whose actions in disease we know very little, presents for exploration to any one really desirous of adding to the advance of therapeutics such a vast unfathomable sea of uncertainty that he may spend a good portion of his professional life before he can make up his mind about the selection of a drug whose numerous actions in disease might seem to him worth working out. It may be taking a roseate view of the profession to think that any considerable proportion of its members are stimulated with a desire to advance its progress in this way, yet my own short and limited experience leads me to believe that but few men ever enter medicine without at some time, especially in their earlier years, indulging in the fond day-dream of leaving the science better than they found it, and many would become valuable contributors to its practical literature if a suitable avenue of research were chalk-marked out for them upon the fields which now lie fallow. This laudable ambition, strong in the early years of practice, is too often allowed to die out just as we know every organ or faculty will atrophy and disappear under disuse.

With more time at our disposal, we might easily dwell upon the numerous and inestimable advantages which would accrue to the science of medicine if there could be devised some method by which therapeutic experience could be lifted out of its present unsatisfactory and somewhat chaotic condition into a higher and better ordered system. In addition to the improvement such a method would make upon the department of treatment, there would be the obvious benefit to ourselves which such an ennobling influence would be certain to cultivate and foster.

In addressing medical men, I need not refer to, much less dwell upon, the fact that the great object of our art is the successful treatment of disease; this being our *raison d'être*, it does seem wonderful and painfully suggestive that for every hundred pages of our medical literature there can scarcely be said to be as many lines devoted to the subject of the treatment of disease.

No one will say that this is as it should be, and if there be real scarcity of records of therapeutic experience, no more powerful argument could be adduced for reformation. What seems to me to be necessary for such reform is the initiation of a radical change in our Journal. A portion of its space should be wholly set apart and dedicated to the ventilation of questions relating to the treatment of disease by members of the Association. To permit the remedies or methods of treatment discussed to be selected by the contributors at random would be to remain precisely as we are at the present moment. All the deterring forces would be still in operation, and the domain of therapeutics would not in the least benefit from the experiment, which in all probability would be a failure. A small committee with a good secretary would be an essential part of the scheme; this committee, upon which the success of the undertaking would, to a large extent, depend, might be selected by this Section, or preferably by the Council of the Association, or, perhaps, better still by the members of the Collective Investigation of Disease Committee, or in any way afterwards to be decided upon by the Association. The duty of this small but important body would be to select one or more remedies whose actions in disease are but imperfectly known, and to invite a full and free discussion and investigation of their virtues through the Journal, the ventilation of each subject to be conducted upon certain definite lines previously to be laid down by the Committee. It is not proposed to invite the compilation or publication of mere statistics, which, though valuable in other departments of medicine and surgery, are often most mischievous when introduced into the domain of therapeutics.

The method of statistical research has been utilized with great benefit and success by the Collective Investigation Committee in some of its labours, which body, I trust, may long exercise itself in clearing up many of the dark and mysterious problems in the other branches of medicine, as they have done in the past.

The present scheme, then, of improving the position of the department of therapeutics would consist mainly of ventilating original bedside observations, and stimulating the various observers to work on certain definitely laid down lines, so that in a short time, from numbers of workers, an amount of valuable experience could be

readily obtained which otherwise could not be procured during many years of patient individual toil. This would necessarily involve the publication of many details which unfortunately would mean additional space, as it does not appear that the publication of mere final conclusions in tabular or very condensed form would be much of a stimulus to clinical observation. Series of short, pithy, original experiences would be of untold value in advancing our knowledge of the action and effects of various remedial agents.

The first President of this Section, in his opening address, selected with much wisdom the subject of "Methods of Therapeutic Research," and in pointing out the various methods by which the work of our Section could be accomplished and its objects advanced, dwelt upon the three methods :—

1. Experiments upon the lower animals;
2. Statistical observation of the results of treatment;
3. Individual observation at the bed-side; remarking that by the first method much had been done in the past, and much would likely be done in the future.

Of the statistical method he wisely said: "Of all methods of research this is the crudest and most unscientific. From such a crude method it is not likely that any useful results could be got, and as a matter of fact, no results have been got. Statistics so compiled are from their birth impregnated with error, and as a contribution to the literature of the question are worse than useless; they are positively misleading. Individual observation is that on which we have to rely; it is that by means of which the most important advances have been made in the past; it is that, too, by which all methods of treatment must be tested, and on the results of which their adoption or rejection must depend. There is immense scope for us in this field, ample to occupy us for many a year to come. There is scarcely a disease whose treatment might not be improved; scarcely a therapeutic question which does not want some light thrown upon it: and the number of such questions grows rather than diminishes."

Can there be a doubt cast upon the advisability of our meeting to-day and freely and earnestly discussing how we may best further the great aim of our Association, and the object of our noble profession, in the perfecting of the treatment of disease and the consequent alleviation of human suffering? The Journal would afford a very easy way of reaching a large percentage of medical men, and there need be little fear that a judicious selection of points upon which records of clinical experiences were invited would yield an abundant harvest of carefully observed and recorded facts, clearing up many doubtful, or exposing many unsuspected, actions of certain selected drugs in certain selected diseases. These results, with proper sifting and supervision, might soon become the most valuable additions made to the science of medicine in our time.

If successfully managed, this method of stimulating combined research might have a beneficial effect upon our current medical literature, exchanging for the harmless or desultory single-file firing the continuous roar of volleys of musketry, before which every obstacle and difficulty could not fail to be swept away. Many men would probably be induced to devote themselves to the close observation of a limited number of remedies when these would be selected for them, and many other men would be induced to give to the world results already obtained during years of practice, which otherwise they never would have thought of publishing.

The proposal is open, no doubt, to serious and even numerous objections, and much chaff would be certain to be found with the wheat. The success of the project would largely depend upon the wisdom and administrative or organizing power of those into whose hands the selection of subjects for investigation would be placed. That it would give a stimulus to therapeutic progress, and strengthen the weakest point in all the machinery of our useful Association, I have not the least doubt. Matters of opinion would have to be carefully separated from matters of fact, and the supervision and condensation of contributions would be labour requiring much skill and discrimination.

If our national Pharmacopœia is to be recognized as in any way indicative of British therapeutics, there must be some method devised and adopted by which the mass of practitioners in this country can have a voice in its construction. It is neither my intention nor desire to find fault with our new British Pharmacopœia, though we must acknowledge it is far from what it should be. Through the efforts of Dr. Quain and the Committee over which he presides, it has reached its present state of development. When we look at the difficulties with which he has had to contend, we cannot withhold our admiration for his great ability and untiring industry, nor can we fail to wonder how the volume is not more seriously defective than it is. It is the method by which this great index of our national therapeutics is compiled more than the present imperfections apparent in the work itself which interests us just now. It can scarcely be denied that there are many substances still included in the present issue which should be excluded, and a host of agents omitted of undoubted and established value in daily use amongst scientific physicians in this country; nor can it be questioned that the subject of dosage requires reconsideration and treatment at the hands of some authorities who have made posology a special study.

Nevertheless, in order to clear away all possible sources of misunderstanding or matters upon which there might be a difference of opinion, let us assume that the present Pharmacopœia, issued in August, 1885, was at that time without spot or blemish, a volume of which every British physician was proud, and with which therapeutists of all countries were perfectly satisfied. Two years have elapsed since them, and at no very distant date, if we are to keep pace in this age of progress, we shall have to face another edition. Even in this short time there have been rapid strides made in some departments of treatment, and already quite a number of new remedial agents, about whose value there cannot be a shadow of a doubt, have come into daily use amongst us. Others are upon their trial and of still questionable utility, and many novelties, with the most worthless and absurd pretensions, are often and extensively prescribed. Better knowledge of some comparatively modern official drugs has changed our views about their dosage and methods of administration since 1885.

We may, without much danger of being considered hypercritical, ask ourselves what steps are being taken to ensure the next issue being thoroughly representative of the advanced knowledge of the day. I believe that the services of the three distinguished editors are still retained, and that reports upon chemical, botanical and pharmaceutical changes are being carefully elaborated by these able experts, who doubtless are closely watching the onward march of events in their allied departments, and the next volume will be a great advance in these respects upon its predecessors.

But what of the purely therapeutic aspect of the work? Shall it be left to chance? Or is anyone devoting himself to the arduous task of watching and compiling the accumulating mass of valuable information scattered throughout the current medical literature of the world, so that it can be rigorously sifted, and the kernels made use of at the proper time? It is unfair to expect that such work can be done by the individual members of the Council. The need of assistance is so obvious and pressing that one wonders why it has been so long delayed.

It is not, however with this point that, as a Section, our duty directly lies. If a purely medical or therapeutical editor were at work even now, a great practical question would remain still unsolved. It is clearly within our province to grapple with this difficult ques-

tion: What drugs shall be excluded, and what new remedies should become official? The solution can only be determined satisfactorily by the voice of the profession. When the present Pharmacopœia was in course of construction, almost the first act performed by this Section after its inauguration was to discuss the pressing necessity of having the voice of the Association heard upon this matter, and resolutions to this effect were passed, and a small committee, consisting of Professor Matthew Hay, Dr. Morrell, and myself, was appointed, but the advanced state of preparation which the work had already reached at the time, and the difficulty of getting the committee together, caused the project to be abandoned.

There are two ways in which this section might aid the General Medical Council in improving the Pharmacopœia. One would be by utilizing the machinery afforded by our Journal and our extensive membership in obtaining a sort of *plébiscite* of the medical profession upon the rejection of several drugs hitherto included in the official list, and upon the acceptance of some well-known drugs not yet receiving the seal of authority. To settle such by the individual opinion of the members of the Pharmacopœial Committee or of the Medical Council will be hardly likely to be accepted as a satisfactory solution of the difficulty; nor does there yet appear to be any practical way of utilizing for this purpose the new principle of representative election introduced last year into the Council by the recent medical legislation. There could be no difficulty in obtaining a tolerably accurate idea of the professional mind through the Journal and different branches of the Association at home and in the colonies.

It may be said that such is unnecessary and undesirable; and though it appears to me that a solution of the Pharmacopœia difficulty cannot be arrived at without recognizing the voice of the bulk of our profession practising in this country upon the question of compiling a truly national index of treatment, nevertheless, there may be a different view held by others, and it would thus seem to be an advisable thing to invite an expression of opinion from those met to-day.

The second method by which this Section might be of the greatest service to the Pharmacopœial Committee and Medical Council is one which would appear even more clearly to fall directly under our duty. It would be in putting to the test and critically examining and reporting upon all new remedies not hitherto in extensive use, though likely to be thought worthy of an official position. This proposition should not be confounded with the former one, which is only meant to apply to the voice of the profession upon the acceptance or rejection of common drugs in daily use. It might not be considered expedient to ask the vote of the bulk of practitioners upon a drug, for example, like fuchsine, which, in all probability, had been only used by a limited number of hardy pioneers of progress.

A list of new agents of good promise could be prepared, and a "plan of campaign" arranged by which, through our Journal, detailed reports of their therapeutical actions and uses and untoward effects might be ventilated, which would be of the greatest use to the profession and to the compilers of the Pharmacopœia. Unless under most exceptional circumstances, no drug should ever be allowed to find its way into the Official List until after the most rigorous and exacting scrutiny of its properties by a large number of independent observers. The exception might be made in tbe rare case of a drug being introduced upon the eve of a new issue of the Pharmacopœia, provided it possessed obvious and striking qualities—like cocaine, for example.

If we wait in the future, as we have hitherto done in the past, till the professional mind is thoroughly satisfied about the utility of a new drug from the isolated and often contradictory reports upon its actions scattered through the medical journals of various countries, then, in the future, as in the past, our national Pharmacopœia will invariably be behind the day, and unworthy of being regarded as a true index of British therapeutics.

If such a plan of inviting and encouraging our own members by every means in our power to publish in the Journal reports of the failures or successes of new drugs were adopted, in a wonderfully short time we could arrive at a tolerably accurate idea of their claim to confidence or of their pretensions to official recognition. This scheme would then achieve two valuable objects: it would bring to the test *without the usual delay* all new importations, and it would prevent the chance of any drug finding its way unworthily into the Pharmacopœia. Thus, by keeping pace closely with therapeutic progress we would effectually, by putting a check upon the admission of remedies, prevent the possibility of frequent erasures in succeeding editions.

I have no doubt that were this scheme carried out by the Council of the British Medical Association, the Pharmacopœia Committee and the Medical Council would heartily fall in with it, and though we could not expect to have every detail of our suggestions always carried, if our part was faithfully and honestly worked out, we would soon have the satisfaction of finding we were employing our great organization in achieving a work of lasting benefit to our art.

Let us look then for a moment at how we could make such a scheme practicable. A small committee with a good energetic secretary would have to be appointed to take the matter in hand, and select, in the first instance, the new drugs likely to have claims for official recognition, and then to invite, aid and encourage investigation, and report upon their actions and values.

Such a committee might only have to meet a few times in the year; much of its planning work could be done through correspondence. It could act under the direction and supervision of the Council of the Association, aided by such suggestions as might from year to year come from this Section in its annual deliberations. It probably would be advisable that its constitution be not subjected to frequent changes, and an annual report of its labour might be laid before the Association or before this Section.

It will be apparent that the first and second proposals laid before the Section to-day can be easily combined, they naturally indeed fuse and become one.

If you are satisfied to recommend the Council of the Association to dedicate a moderate amount of space in the Journal for the ventilation of purely therapeutical subjects selected and watched over by a committee appointed in whatever way the Council may think wise, the new machine could easily take up the work of pharmacopœial reform, and without increasing materially in labour could, by selecting proper drugs for crucial examination, give a powerful stimulus to therapeutic research at the same time. Three separate proposals are thus laid before you for your consideration: the first having solely for its aim the encouragement of a better method of stimulating therapeutic research amongst the members of the Association; the second aiming at making the voice of the Association felt in improving and perfecting the national Pharmacopœia. The third proposition would be to combine the first and second, provided both schemes meet with your approval.

After I had corrected the proof of these remarks last week, our able Secretary, Dr. McHugh, directed my attention to a column in the Journal of August 15, 1885, in which I find that the original propositions discussed at the first meeting of this Section in Belfast were again brought up at the Cardiff meeting by the President of the Council. It was then proposed "that this Section should discuss new remedies and make a selection for further investigation in conjunction wi h the Collective Investigation Committee." A committee of the Section was again appointed to co-operate with the Collective Investigation Committee, and I am not aware that anything has been done by this Committee.

Clearly it seems to me that the propositions which I submit for your consideration can only be worked out by a permanent central organization working somewhat like the sub-committees of Council and commanding the assistance of our Journal and numerous members.

Reviews.

NOTES ON ANALYTICAL CHEMISTRY, for Students in Medicine. By ALBERT J. BERNAYS, Ph.D., F.C.S., F.I.C., Professor of Chemistry at St. Thomas's Hospital Medical School, etc., etc. Second Edition.*

This is mainly a collection of the chief reactions employed for detecting the various elements and acid radicles, together with tests for the other substances, such as alkaloids, glycerine, etc., which may be given for analysis in the chemical portion of the examinations for medical degrees. Being intended solely or chiefly for the use of medical students, who as a rule devote comparatively little time to the subject of chemistry, it aims, as might be expected, at giving the information in as condensed a form as possible; in fact there is no attempt at explanation of the principles or theory of the reactions, but only an indication of the results obtained with the various tests employed. The unavoidable consequence is a great adaptability to cramming purposes.

The arrangement of the subject matter does not appear to have been carried out in a very systematic manner, as we have first a scheme of analysis for simple salts, then studies of the distinctive reactions of the bases and acids (which surely would better precede the analytical scheme), followed by descriptions of the appearance of various common salts, and a tabular arrangement of analytical tests; next comes a list of the substances which may be given in the first M.B. Lond. examination with directions for identifying them, and then half-a-dozen pages are devoted to volumetric analysis (the estimation of alcohol by distillation is inserted in the middle of the volumetric operations); short directions for testing milk, urine, blood, and waters, and for carrying out an ultimate analysis, occupy the next few pages. There is then a sudden return to qualitative inorganic analysis, this time of mixed substances, and the detection of the poisons contained in the list of the London University examination in Forensic Medicine.

The tests are well selected for distinctiveness and ease of application, and are kept within a conveniently small limit as to numbers; but it is to be regretted that the language is sometimes a little ambiguous, and the tests carelessly worded. For instance, "HCl in neutral tartrates a white crystalline pr. of $KHC_4H_4O_6$ or $NH_4HC_4H_4O_6$." "Tartrates: K_2SO_4 on stirring white crystalline pr."—this latter being probably meant to apply to tartaric acid a few lines below. The same looseness is observable in the formulæ assigned to salts such as SbOCl, $MgH_2O_2MgCO_3$, CaO_2ClO, etc., and a rather curious effect is produced by the use of such terms as mercurous in a substantive form, the author frequently speaking of salts of mercurous, antimonous, etc. The analytical scheme is well adapted for its purpose, viz., the rapid indentification of a single salt, and the student is taught to infer such facts as that if he finds in a neutral solution a metal precipitated by Na_2CO_3, he need not look for such acids as carbonates, phosphates, etc. He is also taught to draw conclusions from the appearance, solubility, behaviour on heating, etc., and so would not be likely to expect the tests for chromates or ferricyanides from a colourless potassium salt. The studies of individual metals include not only the commoner ones, but also many of the rarer, viz., thallium, palladium, beryllium, uranium, rubidium and cæsium. The scheme for detecting the substances mentioned in the syllabus of the examinations is a very good one, only the names quina and cinchona would be better as quinine and cinchonine; the statement, too, that ferric chloride gives no reaction with cyanides wants modifying.

The article on volumetric analysis, though very brief, is sufficiently clear to give a good idea of the principles of the process, and those on water analysis, urine, etc., condense the main points of the subjects into a very small space.

From its embracing just those subjects necessary for the medical examinations, and presenting all the necessary tests in such a compact form, this book will no doubt be very popular among students of medicine.

* London: J. and A. Churchill. 1886. Small 8vo. Pp. i.-vi., 1-129. 4*s.* 6*d.*

DIE ROSANILIN UND PARAROSANILIN. Eine bacteriologische Farbenstudie. Von Dr. P. G. UNNA.*

The investigation of which the results are recorded in this *brochure* was apparently originally undertaken simply to clear up an obscurity in the practical staining of microscopic sections, but it was eventually extended until it disclosed several interesting chemical facts, and even touched the fringe of practical dyeing. In a process for the staining of sections containing the microbes of leprosy (*Coccothrix leprœ*, Lutz), which consisted in immersing the section in a solution of an aniline compound, subsequently treating it with potassium iodide and hydrogen peroxide, and then decolorizing it partially with alcohol, it was found empirically that the best results were obtained with the compound known as "gentian violet," which is a benzyl derivative of methylpararosaniline. Seeking an explanation of this, Dr. Unna experimented with a number of rosaniline and pararosaniline compounds, and found that there was a marked difference in the behaviour of the two series of compounds, pararosaniline and its derivatives staining the coccus form of the microbes, and rosaniline and its derivatives only the bacillus form. Although these compounds are very closely allied, rosaniline being the next higher homologue of pararosaniline, this difference in their tinctorial properties is said to be so marked as to afford a delicate test for distinguishing between the two series. In following up the inquiry it was found that the permanent coloration is due probably to the combination of the aniline compound, which has exercised its elective affinity for particular tissue, with the iodide to form an insoluble double salt, and that the difference in behaviour is due primarily to the much greater affinity of pararosaniline for iodine. The steps by which this conclusion was reached are described with all that careful detail that is characteristic of German scientific memoirs.

* Dermatologische Studien. Viertes Heft. Hamburgh L. Voss. 1887. Demy 8vo. Pp. 1-73. 2*s.*

Obituary.

Notice has been received of the death of the following:—

On the 28th of June, Mr. Edmund Seddon, Chemist and Druggist, North Road, Preston. Aged 50 years.

On the 9th of August, Mr. Henry Walton, Chemist and Druggist, Chester Road, Manchester. Aged 32 years.

On the 10th of August, at Brixton, while on a visit to England, Mr. William Kingston, Chemist in Malta for upwards of thirty years. Aged 54 years.

On the 12th of August, Mr. William Sinclair, Pharmaceutical Chemist, Upper Kirkgate, Aberdeen. Aged 78 years. Mr. Sinclair had been a Member of the Pharmaceutical Society since 1853.

On the 14th of August, Mr. John Thomas Watts, Chemist and Druggist, High Street, Hampton Wick. Aged 57 years.

On the 14th of August, Mr. Luke Elliott, Chemist and Druggist, Grimesthorpe, near Sheffield. Aged 62 years.

On the 16th of August, at Head Street, Colchester, Evan Charles, eldest son of the late Mr. Evan Thomas Prosser, Pharmaceutical Chemist. Mr. E. C. Prosser was a Registered Apprentice of the Pharmaceutical Society.

On the 19th of August, Mr. Edward Hutchinson, Chemist and Druggist, Moss Side, Manchester. Aged 67 years.

On the 21st of August, Mr. Reuben Baily, Chemist and Druggist, Ramsgate. Aged 64 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Action of Iron on Gentian, Catechu, etc., in presence of Dilute Phosphoric Acid.

Sir,—It having been brought under my notice lately by several medical men, that a presentable mixture could be made with iron and gentian upon adding to it dilute phosphoric acid, the following experiments were tried to find out to what extent this could be utilized.

Fifteen minims of liquor ferri perchlor. were added to ℥j. of fresh infusion of gentian, and a black inky mixture resulted; to this was added drop by drop acid. phos. dil. until the inky colour was discharged, ten drops were sufficient to effect this. It was found, by adding the acid to the gentian and the iron last, that rather less acid was needed.

Three six ounce mixtures were made as follows:—

Liq. ferri perchlor.	℥iss.
Ac. phos. dil.	℥j.
Infus. gentian	ad ℥vj.

They were mixed in different ways to see if this was likely to affect the ultimate appearance. 1. The iron was added to the infusion and the acid last. 2. The iron and acid were mixed and the bottle filled up with the infusion. 3. The acid was added to the infusion and the iron last. All three mixtures were free from inkiness. No. 3 appeared brightest at first, but after standing for an hour it was extremely difficult to distinguish any difference between them; all three had become slightly clouded, with a slight precipitate. After standing three days the precipitate was more pronounced.

Several experiments were tried with other acids (acid. nit. dil., etc.), but no satisfactory results were obtained. The quantity of acid required was above the Pharmacopœia dose. With these acids, as with acid. phos. dil., it was found that rather better results were obtained by adding the acid to the infusion, and, finally, the iron.

Thirty minims tinct. catechu with ♏xv. liq. ferri perchlor. in ℥i. water required ♏xx. acid. phos. dil. to remove the inkiness. If double the quantity of tincture is used with the same quantity of iron ♏xx. of acid is sufficient, but if to ♏xxx. of the tincture ♏xxx. of iron be added, the acid must be slightly increased. With tinct. krameriæ a less quantity of acid is sufficient; ♏xxx. of this tincture with ♏xv. of liq. ferri require only ♏x. of acid. With this as with catechu, if the iron is increased the acid must be increased in proportion.

One grain of acid. tannic. with ♏xv. of liq. ferri in ℥j. water requires about ♏xxv. of acid to discharge the colour completely.

The black colour produced with iron and digitalis, iron and belladonna and iron and hyoscyamus is also discharged by this acid.

Edward A. Andrews.

Antiquated Pharmacy.

Sir,—I have just been reading in the Journal of August 20, the interesting notice by Mr. C. J. S. Thompson, "A Glimpse at Pharmacy in the Seventeenth Century," and it has occurred to me that I would send you the copy of an order which I received from a lady some years ago: I find the date is March 27, 1856.

13, *Baker Street, W.* John Taylor.

Verbatim Copy of Order.	*s.*	*d.*
" Licoris root fresh	1	0
id d in powder	0	6
jus de reglisse	0	6
oil paper	0	6
cochlearia hortensis		
foglia fresh	1	0
(scurvy grass)		
wild large valerian fresh	0	8
1 dozen toads		
(could you get somebody to catch the toads, kill and dry them so as to make them fit for transport. Here there is not one to be had all over Ireland nor a viper either)		
The brains or heads of six ravens		
fumitory or		
fumaria officinalis	0	8
Senna	0	6
Virginian snake root		
aristolochia serpentaria	0	8
poivre des murailles		
(sedom acrae) if possible fresh	0	3
inula hellenium		
elecampane root	1	0
Bryonia alba	2	0
fresh juniper berries		
2 pounds		
caffe 4 id (1sh 6d)		
black tea 2 id (4sh)		
grease of vipers		
or oil, or the flesh	1	0
poppy seeds	0	8
green roman vitriol		
4 ounces, light green		
fuligo splendens		
(soot)	0	8
quercus		
the bark of oak	0	8
lime flowers	1	0
laudanum	1	0
canela alba		
white cinamon	1	0
yellow wax	1	0
spanish cress seeds		
or indian cress:		
cardamindum capucinae	1	0
unguentum popoleum	2	0

" Would you be so kind and order 1 lb. of Chocolate with vanilla and if possible a large dish full of fresh large shrimps."

The Action of Pepsine on Albumen.

Sir,—I should like to ask Mr. Schweitzer in what sense he uses the word "digest" in its application to the action of pepsine on albumen. Does he use it in its strictly physiological sense, or is the quantity of albumen which a pepsine dissolves expressed as the quantity which it digests? That is, are "digestive power" and "proteolytic power" synonymous terms?

74, *Market Place, Sheffield.* G. A. Grierson.

W. A. L.—Watts's 'Dictionary of Chemistry,' vol. i., p. 747.

J. L. A.—'The Analyst' is published by Messrs. Baillière, Tindall and Cox, King William Street, Strand, W.C.

T. F. E.—The question, as you put it, is an open one, although the seventeenth section applies to all cases of sale of the articles referred to. Except by means of analysis it does not appear how the facts of the case could be established, and it is not evident whose business it would be to take such work in hand.

Disgusted.—You are recommended to communicate to the Registrar any evidence you may possess of the existence of the practice complained of.

Communications, Letters, etc., have been received from Messrs. Bustard, Andrews, Farrow, Crow, Maben.

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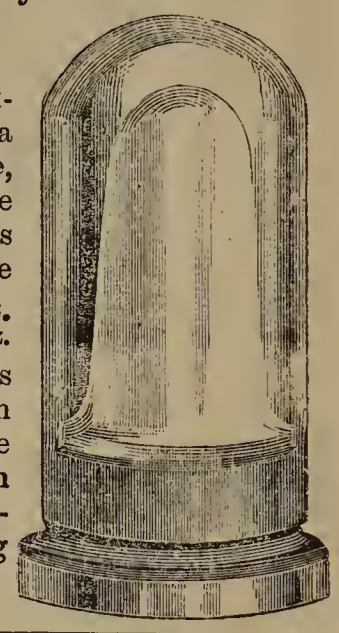

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Special Classes are held in the Hospital for Students preparing for the Examinations of the University of London and of other examining boards.

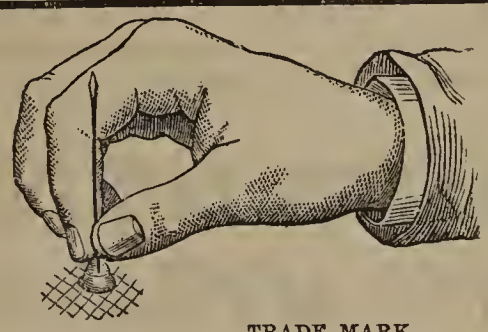
APPOINTMENTS.—The House Surgeons and House Physicians, the Obstetric Residents, Clinical Assistants, and dressers, are selected from the Students according to merit and without payment. There are also a large number of Junior Appointments, every part of the Hospital Practice being systematically employed for instruction.

ENTRANCE SCHOLARSHIPS.—Open Scholarships of 125 guineas in Classics, Mathematics, and Modern Languages. Open Scholarships of 125 guineas in Chemistry, Physics, Botany, and Zoology.

PRIZES, &c.—Eight Scholarships, varying in value from £10 to £50 each, for general proficiency in Medical Study; the Treasurer's Gold Medal in Medicine; the Treasurer's Gold Medal in Surgery; the Gurney Hoare Prize of £25, for Clinical Study; the Beaney Prize of 30 guineas for Pathology; the Sands Cox Scholarship of £15 per annum for three years, for Physiology; the Michael Harris Prize of £10, for Anatomy; Golding Bird Prize of the value of £33—subject: Methods and Diagnosis in Disease; the Mackenzie Bacon Prize for Nervous Diseases, of £15.

For prospectus and further information apply to the Dean, Dr. F. Taylor.

Guy's Hospital, London, S.E., August, 1887.



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Physicians—Dr. Langdon Down, Dr. Hughlings Jackson, F.R.S., Dr. Sutton, Dr. Fenwick, Dr. Stephen Mackenzie, Dr. Sansom, Dr. Charlewood Turner, Dr. Gilbart Smith, Dr. Warner, Dr. Ralfe.

Assistant Physician—Dr. James Anderson.

Surgeons—Mr. Couper, Mr. Rivington, Mr. Waren Tay, Mr. McCarthy, Mr. Frederick Treves.

Assistant-Surgeons—Mr. Reeves, Mr. C. Mansell Moullin, Mr. Hurry Fenwick, Mr. F. S. Eve.

Obstetric Physician—Dr. Herman.

Assistant Obstetric Physician—Dr. Lewers.

Ophthalmic Surgeons—Mr. Waren Tay, Mr. F. S. Eve.

Physician to the Skin Department—Dr. Stephen Mackenzie.

Aural Surgeons—Dr. Edward Woakes, Mr. T. Mark Hovell.

Surgeon-Dentist—Mr. Barrett.

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Surgery—Mr. Rivington.
Operative Surgery—Mr. Rivington.
Practical Surgery—Mr. Reeves.
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Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Chemical Physics—Mr. F. J. M. Page.
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Emeritus Professor of Medicine—Sir Andrew Clark, Bart., F.R.S.
Emeritus Professor of Surgery—Mr. Jonathan Hutchinson, F.R.S.

The SESSION 1887-88 will commence on Saturday, October 1st, 1887. The New Buildings, which were opened by their Royal Highnesses the Prince and Princess of Wales on May 21st, afford more than double the accommodation which was provided formerly.

Fee for Lectures and Hospital Practice, 90 guineas in one sum, or 100 guineas by three instalments.

The Hospital contains nearly 800 beds. Number of In-patients during 1886 was 8,743; Out-patients 80,591.

The Resident and other Hospital Appointments are free to full Students. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, one Accoucheurship, and one Receiving-room Officer; Dressers and Maternity Assistants also reside in the hospital.

The holders of all the Resident Appointments are provided with rooms and board entirely free of expense.

Two Entrance Science Scholarships, value £60 and £40, and two Buxton Scholarships, value £30 and £20, will be offered for competition at the end of September to new Students.

The Letheby Prize, value £30, for proficiency in Chemistry.

A Scholarship, value £20, in Human Anatomy and Physiology, to first-year's Students.

A Scholarship, value £25, in Anatomy, Physiology, and Chemistry, to second-year's Students.

A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

A Duckworth Nelson Prize, value £10 (biennial), in Clinical Medicine and Surgery.

The Hutchinson Prize, value £35 (triennial), in Clinical Surgery.

Prizes, value £60, to Dressers of Out-patients in Minor Surgery.

Special Classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London, and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England, are held throughout the year.

Special entries for Medical and Surgical Practice are made.

The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, Metropolitan District, East London, and South Eastern Railways have Stations within a minute's walk of the Hospital and College

For prospectus and particulars apply, personally or by letter, to

Mile End, E. MUNRO SCOTT, Warden.

St. Thomas's Hospital Medical School,

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The WINTER SESSION of 1887-88 will commence on OCTOBER 1, when an Introductory Address will be delivered by R. W. REID, Esq., F.R.C.S., at 3 p.m.

Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

All Hospital appointments are open to students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several medals.

The fees may be paid in one sum or by instalments. Entries may be made to lectures or to Hospital practice, and special arrangements are made for students entering in their second or subsequent years, also for dental students and for qualified practitioners.

Several medical practitioners and private families residing in the neighbourhood receive students for residence and supervision, and a register of approved lodgings is kept in the secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

R. W. REID, Vice-Dean.

Victoria University.—An Entrance

Examination in Arts (introductory to the Faculty of Medicine) will be held at Owens College, Manchester, and at University College, Liverpool, in September, beginning on the 26th.

Applications for admission must be made (in writing) on or before September 12th, to the Registrar, by whom further information will be sent.

Full particulars as to Degrees, Examinations, and Courses of Study in the Faculty of Medicine will be sent on application.

Copies of examination papers are printed in the University Calendar, published by Mr. J. E. Cornish, Manchester, and Messrs. Macmillan & Co., London (price 1s.; by post 1s. 3d.).

A. T. BENTLEY, M.A.
Manchester, August, 1887. *Registrar.*

Owens College, Victoria University,

MANCHESTER. PHARMACEUTICAL DEPARTMENT.

The classes at the College qualify for the Pharmaceutical Society's Examinations. Full particulars will be forwarded on application to H. W. HOLDER, M.A., Registrar.

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Assisted by—
MR. GEO. CLAYTON, PHARM. CHEM.

The Session will begin on August 29th, and will include the usual Courses of **Full Time, Afternoon, Evening** and **Once-a-Week** classes for the Minor; and private classes for the Major.

The past session has been very successful, **Eleven** men passing in the June and July Examinations alone.

Full particulars on application.

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THE TWENTIETH SESSION, 1887-8,
Will commence on the 12th September.

For Fees, &c., apply to W. BAXTER, Secretary.

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JULY PRELIMINARY—**FIVE** sent up, **FOUR** passed.

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PHARMACEUTICAL Preliminary. Special Postal preparation for October or January. Stamp for terms. Mr. W. L. T. WHATHAM, B.A. (London), Clarence House, 42, Adelaide St., Southport, Lancashire.

PHARMACEUTICAL Preliminary, London Matriculation, Apothecaries' Hall, College of Preceptors, and all Medical Preliminaries. Mr. A. H. DAWES, 1st B.A. (Lond.), will continue his successful preparation, privately and in class, for the above examinations for the 8th consecutive year. Students rapidly prepared by Postal Tuition. Candidates coached for Bell Scholarship. Address, 31, Southampton Street, Strand, W.C.

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All at their first attempt.

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Mr. J. W. Lang, Southport

Minor.

Mr. H. Aspinall, Liverpool | Mr. T. Clough, Liverpool
,, W. Bentley, Lancaster | ,, C. E. Hanslow, Woodford
,, T. Birkett, Workingt'n | ,, E. Jones, Portmadoc
,, E. G. Bond, Liverpool | ,, J. E. Jones, St. Asaph
,, T. W. Carr, Knaresbro' | ,, B. Phillips, St. Clears
,, G. M. Gass, Whitehaven | ,, A. Stephen, Liverpool

Preliminary.

Mr. J. H. Griffiths, Little Brighton | Mr. J. H. Marples, Birk'h'd
,, A. A. Jones, Liverpool | ,, H. E. Sawden, Liverp'l
,, W.H.Warhurst,Liverpl

Apothecaries' Hall—Mr. J. W. Whitely, Gainsborough.

Jacob Bell Scholarship—Mr. W. A. Salter, Birkenhead (one of the Bell scholars for next session), is a member of the Chemistry and Pharmacy class.

NOTE.—*All that have been sent in for (a) the Major, (b) the Preliminary, and (c) the Apothecaries Hall during this session have passed.*

The next session will commence on Monday, Sept. 5, 1887. Those desirous of joining the October or December Classes should enter at once. New Syllabus, with full particulars of Classes, Fees, &c., sent free on application.

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Laboratory and School Buildings :

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Lecturer on the art of Prescribing, and Teacher of Materia Medica at St. George's Hospital, S.W.

DEMONSTRATORS.

Mr. T. A. ELLWOOD, M.P.S., &c.
,, C. W. BRUMWELL, M.P.S., &c.

The next Course of Lectures and Classes will commence on September 1st, entries for which can now be received. For Prospectus, apply to

Mr. JOHN WOODLAND, 173, Marylebone Rd., London, N.W.

WESTMINSTER COLLEGE

The next Session will commence on Monday, September 5th.

FEES.
To the October Examination ... ... £6 6s.
,, December ,, ... £9 9s.
12 Months' Course (Minor and Major), £15 15s.
Preliminary, £1 1s. per month.

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The annexed Pass-lists speak for themselves, and are a more reliable guide than flattering advertisements in enabling Students to decide at which school they can prosecute their studies with the greatest success.

APRIL, 1887.

MAJOR.

Mr. J. L. ARMITAGE. | Mr. P. WATSON.

MINOR.

Mr. A. E. BEARD. | Mr. R. G. HINDLE.
,, H. R. BROAD. | ,, E. JEFFERY.
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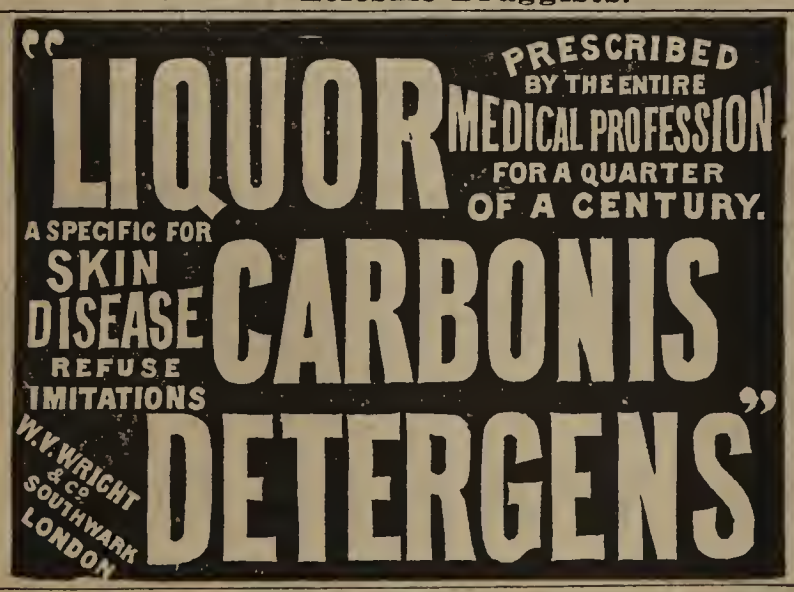

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during September. The Library and Museum in London will be closed the first fortnight in September.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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OF THE

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FORTY-SIXTH SESSION, 1887—88.

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Professor WYNDHAM DUNSTAN .....CHEMISTRY.
Professor ATTFIELD ....PRACTICAL CHEMISTRY.
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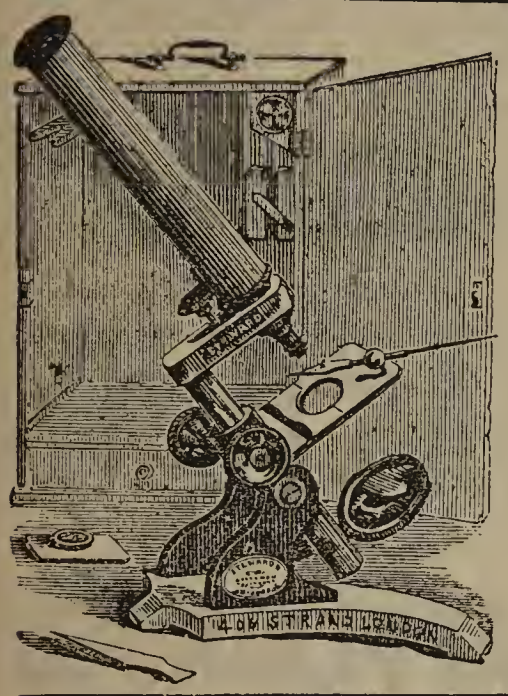

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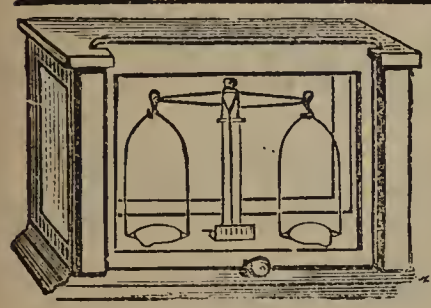

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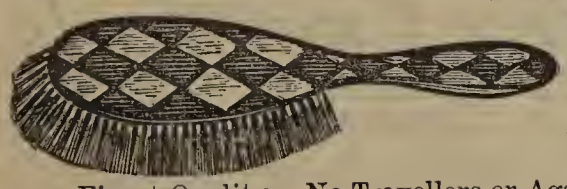

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These are composed of COCAINE, Chlorate of Potash and Borax. In irritation, catarrhal and other diseased conditions of the throat, COCAINE administered as a continuous medication seems to work well. It improves the voice-tones at once—a husky voice often clearing under its action in a couple of hours. It inures the throat to trying conditions and preserves it free from the usual unpleasant effects of inclement weather. The best way to employ COCAINE for the throat is in the form of the Voice Tabloids, which contain also Potash and Borax.

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PRESERVATION OF THE SALT.—The bottles must be kept well corked to prevent the salt from disintegration, and as the crystallized Salt commences to deliquesce at a temperature of about 88° Fahr., care must be taken to keep it in a dry cool place.

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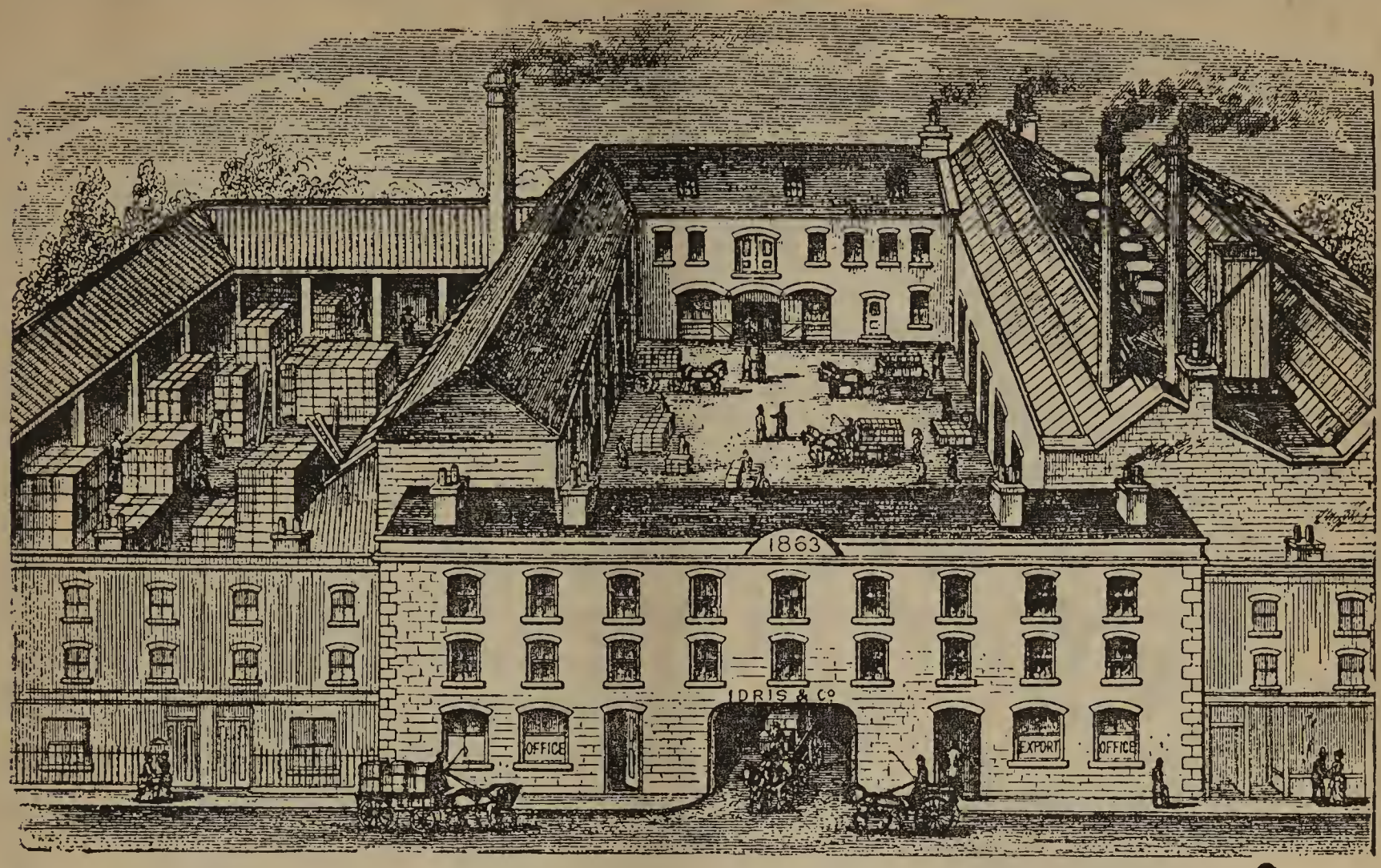

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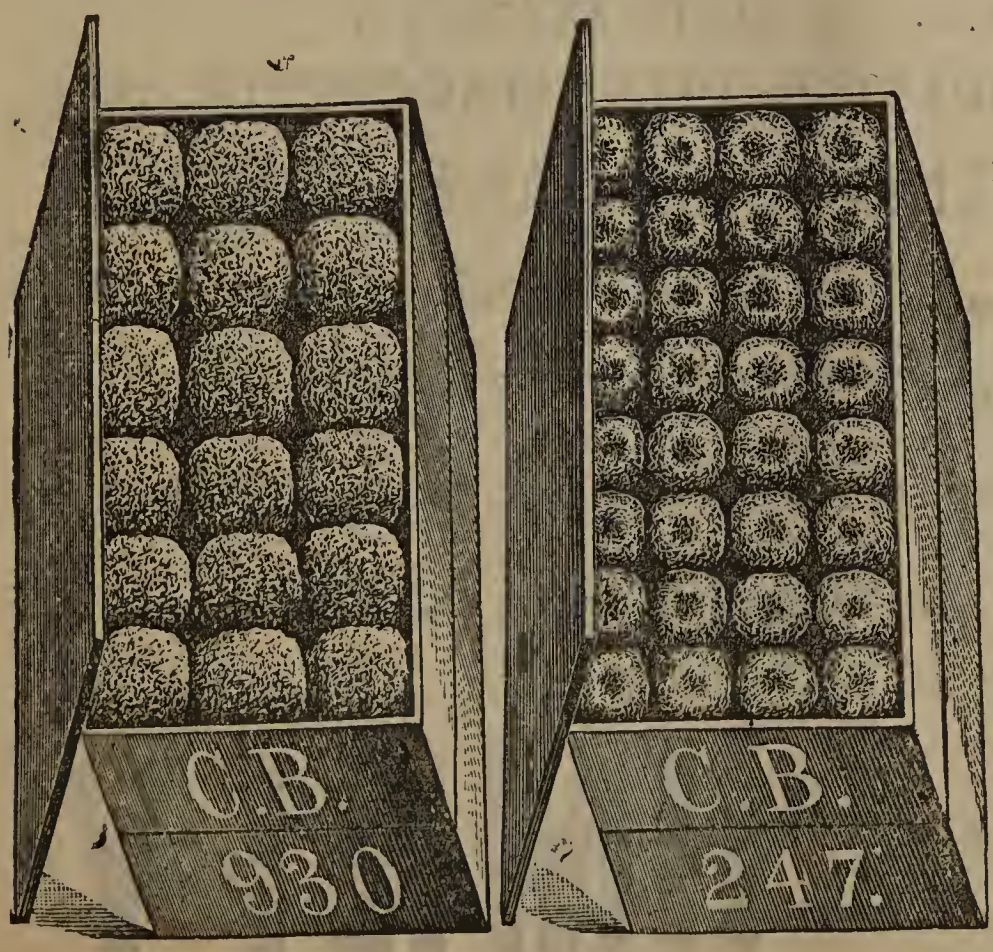

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10	3rd	Do. assorted sizes	145	105/
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18	2nd	Do. do. ..	60	140/
19	2nd	Do. Bath sizes ..	35	180/
20	3rd	Finest Cups, assorted sizes ..	110	180/
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Umney's Fluid Extract of Red Cinchona Bark. Essential Oil Almonds, Free from Prussic Acid.

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PREPARATIONS OF BRITISH PHARMACOPŒIA, 1885.

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UNOFFICIAL FORMULARY.

REPORT OF THE COMMITTEE APPOINTED BY THE BRITISH PHARMACEUTICAL CONFERENCE.

Introductory Remarks.

The British Pharmaceutical Conference, at its Annual Meeting, held at Birmingham, in August, 1886, appointed a Committee of ten of its members to prepare a Formulary of Unofficial Remedies.

The proposal that this step should be taken was received by the members present with such cordial approval that there could be no doubt that it expressed the feeling of a general want. The revision of the British Pharmacopœia has been undertaken at periods so long apart that the remedies introduced as new preparations in the latest edition have usually enjoyed extensive use during many years before their official recognition. Such a period of probation appears fitting, rather than the introduction to the medical world of new and untried remedies in the pages of the national Pharmacopœia. If this position be accepted, it rests either with individuals or with associations to advise as to the best formulæ for the administration of such remedies. This may involve considerations as to the material to be employed, its preliminary preparation, the most suitable solvent and process, the best proportions, and finally what adjuvants are most appropriate.

More than ten years since, the Société de Pharmacie of Paris, moved by identical considerations, appointed a Committee to prepare such a formulary, and the result was a valuable contribution to pharmacy.* The American Pharmaceutical Association has also issued a comprehensive provisional formulary.

The Committee of the British Pharmaceutical Conference cannot feel surprise if circumstances appear to have placed upon the body which they represent the responsibility of undertaking a like duty for Great Britain.

They have only to look back for the past fifty years to find that English pharmacists have supplied and continue to supply to medicine and pharmacy the most valuable of the published compilations of unofficial formulæ, a condition similar to that long found in France and in the United States.

It is self-evident that when new remedies are first introduced, the conditions of their fair trial demand that the preparations employed should be made *secundum artem*. It is also an important consideration, in the interest of the patient, that qualities that may be nauseous should be corrected or disguised by combination. The prescriber of the present day accords much more consideration to this than was the case formerly, and the term "elegant pharmacy" has become recognized as descriptive of a large and popular class of medicines. These cannot wait for the authority of the national Pharmacopœia, but they are important in the equipment of the practitioner of medicine, and their composition ought to be uniform and known both to prescriber and dispenser. To the prescriber, the Unofficial Formulary is offered with the belief that the principles upon which it is constructed will receive his approval, and that it will constantly suggest eligible combinations of medicines which he desires to employ. To the dispenser it affords information of the composition of medicines which he is called upon to supply, enabling him to prepare them, and to have supplies in a fresh condition, where demand might be too infrequent to secure this in the case of purchased stocks. It may reasonably be trusted that the Formulary will gradually relieve both classes from some of the incubus caused by the use of remedies of secret composition. Whilst the present issue is of limited scope, it is hoped that early additions will be made.

The formulæ now published have been selected by the Formulary Committee from those suggested for consideration by its several members. They include a few formulæ from the United States Pharmacopœia, some already published in the 'Extra Pharmacopœia' by Mr. W. Martindale and Dr. W. Wynn Westcott, and one or two from the "Physician's Pharmacopœia" by Mr. J. Baily. The footnotes relating to the description of drugs, and the authorities for their botanical sources, have been kindly supplied by Mr. E. M. Holmes, Curator of the Museum of the Pharmaceutical Society of Great Britain.

Suggestions for alterations or additions are invited, addressed, "The Hon. Secretary, Formulary Committee, 17, Bloomsbury Square, London, W.C."

In order to indicate clearly that the formulæ of the Unofficial Formulary are intended, it is suggested to the prescriber to add the letters, "B.P.C."

Members of the Formulary Committee.

W. Martindale, *Chairman.*	T. Maben.
W. A. H. Naylor, *Secretary.*	N. H. Martin.
A. C. Abraham.	R. Reynolds.
T. Greenish.	C. Symes.
T. B. Groves.	J. C. Thresh.

Formulæ.

The weights and measures adopted in the following formulæ are those recognized by the British Pharmacopœia. The drugs and preparations are also those of the British Pharmacopœia, unless otherwise defined.

Chloral cum Camphorâ.

Chloral with Camphor.

Take of—

Camphor	1 ounce.
Hydrate of chloral	1 „

Rub together in a warm mortar until completely liquefied, and filter if necessary.

Elixir Cascara Sagrada.

Elixir of Cascara Sagrada.

Take of—

Tincture of fresh orange peel	2 fluid ounces.
Rectified spirit	1 „
Cinnamon water	3 „
Syrup	6 „
Liquid extract of cascara sagrada	8 „

Mix.

Dose.—15 minims to 2 fluid drachms.

Elixir Guaranæ.

Elixir of Guarana.

Take of—

Guarana,* in No 60 powder	4 ounces.
Light magnesia	½ „
Oil of cinnamon	6 minims.
Syrup	2 fluid ounces.
Proof spirit, a sufficient quantity.	

Mix intimately the powders, and moisten them with 3 fluid ounces of proof spirit. After twenty-four hours

* Vide *Pharmaceutical Journal*, Series 3, vol. vii., p. 1039 *et seq.*

* A dried paste prepared from the crushed or ground seeds of *Paullinia sorbilis*, Martius.

maceration, mix with 8 ounces of coarse sand, and pack in a percolator; pass through proof spirit until 16 ounces are obtained, then transfer the mass to a press-bag and apply pressure. To the percolate add the syrup and oil of cinnamon, and make up to 1 pint by addition of the expressed liquid, previously reduced by evaporation if necessary.

Dose.—½ to 2 fluid drachms.

Elixir Simplex.
Simple Elixir.

Take of—

Oil of bitter orange*	30 minims.
Rectified spirit	6 fluid ounces.

Dissolve, and add—

Distilled cinnamon water	7 „
Syrup	7 „

Mix. Filter through paper moistened with proof spirit, and well sprinkled with kaolin, returning the first portions of filtrate until it passes through bright.

Dose.—20 to 60 minims.

Emulsio Olei Morrhuæ.
Emulsion of Cod Liver Oil.

Take of—

Cod liver oil	40 fluid ounces.
Tragacanth, in powder	200 grains.
Simple tincture of benzoin	½ fluid ounce.
Spirit of chloroform	½ „
Glycerine	2 „
Oil of cassia†	2 fluid drachms.
Distilled water, a sufficient quantity.	

Place the oil in a dry Winchester quart, and pour in the tragacanth, tincture of benzoin, and spirit of chloroform previously well mixed; agitate briskly for a minute; then add all at once 1 pint of distilled water and agitate as before. Lastly, add the essential oil, glycerine and sufficient distilled water to produce 4 pints. Shake vigorously for a few minutes.

Dose.—2 to 8 fluid drachms.

Extractum Grindeliæ Liquidum.
Liquid Extract of Grindelia.

Take of—

Grindelia,‡ in No. 20 powder	20 ounces.
Rectified spirit, a sufficient quantity.	

Moisten the powder with 8 fluid ounces of the spirit, pack it tightly in a percolator, and pour on sufficient menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop, close the lower orifice and macerate for forty-eight hours; then allow percolation to proceed, gradually adding menstruum until the grindelia is exhausted. Reserve the first 17 fluid ounces of the percolate, distil off the spirit from the remainder, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the liquid extract measure one pint.

Dose.—10 to 30 minims.

Extractum Hamamelidis Liquidum.
Liquid Extract of Hamamelis.

Take of—

Hamamelis leaves,§ in No. 40 powder	20 ounces.
Rectified spirit, Distilled water	of each, a sufficient quantity.

Moisten the powder with 8 fluid ounces of a mixture of one volume of rectified spirit and two volumes of distilled water, pack it tightly in a percolator, and pour on sufficient menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop, close the lower orifice and macerate for forty-eight hours; then allow percolation to proceed, gradually adding menstruum until the hamamelis is exhausted. Reserve the first 17 fluid ounces of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the liquid extract measure one pint.

Dose.—2 to 5 minims.

Extractum Hydrastis Liquidum.
Liquid Extract of Hydrastis.

Take of—

Hydrastis,* in No. 60 powder	20 ounces
Rectified spirit, Distilled water	equal parts, a sufficient quantity.

Moisten the powder with 8 fluid ounces of the diluted spirit, pack it tightly in a percolator, and pour on sufficient menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop, close the lower orifice and macerate for twenty-four hours; then allow percolation to proceed, gradually adding menstruum until the hydrastis is exhausted. Reserve the first 17 fluid ounces of the percolate, distil off the spirit from the remainder, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the liquid extract measure one pint.

Dose.—5 to 30 minims.

Injectio Curare Hypodermica.
Hypodermic Injection of Curare.

Take of—

Curare† (the South American Indian arrow poison)	5 grains.
Distilled water, a sufficient quantity.	

Reduce the curare to powder in such a way as to prevent its coming in contact with the naked hand, and add distilled water to form a thin paste. Transfer to a small funnel plugged with absorbent wool, and gradually pour upon it distilled water until 1 fluid drachm is obtained. If the injection be required in haste, proceed in the following manner:—

To the 5 grains of curare reduced to powder add 1 fluid drachm of distilled water, throw on a filter, and when the liquor ceases to drop pour over the contents of the filter distilled water sufficient to produce 1 fluid drachm.

Dose.—1 to 6 minims.

Linimentum Opii Ammoniatum.
Ammoniated Liniment of Opium.

Take of—

Soap liniment	6 fluid ounces.
Compound camphor liniment	6 „
Tincture of opium	6 „
Belladonna liniment	1 „
Stronger solution of ammonia	1 „

Mix and filter.

Liquor Ferri Hypophosphitis Compositus.
Compound Solution of Hypophosphite of Iron.

Take of—

Hypophosphite of calcium	320 grains.
Hypophosphite of sodium	320 „
Hypophosphite of magnesium	160 „
Sulphate of iron	240 „
Carbonate of sodium	320 „
Hypophosphorous acid, sp. gr. 1·136	1 fluid oz.
Distilled water, a sufficient quantity.	

Dissolve the hypophosphites of calcium, sodium and magnesium in 8 ounces of water. Dissolve the sulphate of iron and carbonate of sodium in separate portions of

---

* A volatile oil obtained by mechanical means from the rind of *Citrus vulgaris*, Risso. Should be free from terebinthinate odour.

† A volatile oil distilled from the bark of *Cinnamomum Cassia*, Blume.

‡ The leaves and flowering tops of *Grindelia squarrosa*, Dunal; and *Grindelia robusta*, Nuttall.

§ *Hamamelis virginica*, Linné.

* The rhizome of *Hydrastis canadensis*, Linné.

† A dry inspissated extract of varying composition, prepared in South America from the bark of different species of Strychnos (principally *Strychnos toxifera*, Schomburgk) and other plants.

water; mix and wash the precipitated carbonate of iron with sweetened water until the washings cease to give a precipitate with solution of nitrate of barium. Transfer the moist precipitate to the solution of the hypophosphites, and add gradually the hypophosphorous acid. Make up to one pint by the addition of distilled water.

Each fluid drachm contains about 2 grains each of hypophosphite of sodium and calcium, 1 grain of hypophosphite of magnesium, and 1½ grains of hypophosphite of iron.

Dose.—½ to 2 fluid drachms.

Liquor Picis Carbonis.
Solution of Coal Tar.

Take of—

Prepared coal tar	4 ounces.
Tincture of quillaia	1 pint.

Digest at a temperature of 120° F. for two days, allow to become cold, and decant or filter.

Pilula Ferri (Blaud).
Iron Pill (Blaud).

Take of—

Sulphate of iron	60 grains.
Carbonate of potassium	36 „
Sugar, in powder	12 „
Tragacanth, in powder	4 „
Glycerine, Distilled water, of each	2½ minims.

Reduce the sulphate of iron to fine powder, add the sugar and tragacanth, and mix intimately. Finely powder the carbonate of potassium in another mortar, and thoroughly incorporate with it the glycerine and water. Transfer this to the mortar containing the sulphate of iron, beat thoroughly until the mass becomes green and assumes a soft pilular consistence, and divide into twenty-four pills.

Each pill contains about 1 grain of ferrous carbonate.

Dose.—1 to 3 pills.

Pix Carbonis Liquida Præparata.
Prepared Coal Tar.

Place commercial coal tar in a shallow vessel, and heat at a temperature of 120° F. for one hour, stirring frequently.

Syrupus Apomorphinæ Hydrochloratis.
Syrup of Hydrochlorate of Apomorphine.

Take of—

Hydrochlorate of apomorphine	5 grains.
Dilute hydrochloric acid	2 fluid drachms.
Rectified spirit	7 „
Distilled water	7 „
Syrup	18 fluid ounces.

Mix the rectified spirit and distilled water, dissolve the hydrochlorate of apomorphine in the mixture by agitation; add the hydrochloric acid, and mix with the syrup.

Dose.—½ to 1 fluid drachm.

Syrupus Butyl-Chloral.
Syrup of Butyl-Chloral.

Take of—

Hydrate of butyl-chloral	320 grains.
Syrup, sufficient to produce one pint.	

Dissolve the hydrate of butyl-chloral in the syrup previously made hot.

Dose.—1 to 4 fluid drachms.

Syrupus Calcii, Manganesii et Potassii Hypophosphitum.
Syrup of the Hypophosphites of Calcium, Manganese and Potassium.

Take of—

Hypophosphite of calcium	320 grains.
Hypophosphite of manganese	160 grains.
Hypophosphite of potassium	160 grains.
Boiling distilled water	4 fluid ounces.

Rub together in a hot mortar till nearly dissolved, and add—

Syrup sufficient to produce 1 pint.

Dose.—½ to 1 fluid drachm.

Syrupus Cascara Sagrada.
Syrup of Cascara Sagrada.

Take of—

Liquid extract of cascara sagrada	4 fluid ounces.
Liquid extract of liquorice	3 „
Carminative tincture	2 fluid drachms.
Syrup, sufficient to produce 1 pint.	

Mix.

Dose.—1 to 4 fluid drachms.

Syrupus Ferri Hypophosphitis.
Syrup of Hypophosphite of Iron.

Take of—

Sulphate of iron	232 grains.
Distilled water (cold)	2 fluid ounces.

Dissolve. Then take of—

Hypophosphite of calcium	160 grains.
Hypophosphorous acid, sp. gr. 1·136	2 fluid drachms.
Distilled water (cold)	4 fluid ounces.

Dissolve; mix the two solutions in a closed bottle, and after standing one hour, filter the mixture on to

Sugar	15 ounces.

Wash the precipitate with—

Distilled water, sufficient to produce 1 pint.

Dissolve without heat. This syrup should be kept in perfectly full bottles, and syphoned off bright when required.

Dose.—½ to 2 fluid drachms.

Syrupus Ferri Phosphatis Compositus.
Compound Syrup of Phosphate of Iron.

Take of—

Iron wire, free from rust	37½ grains.
Concentrated phosphoric acid, sp. gr. 1·5	1 fluid ounce.
Distilled water	5 fluid drachms.

Put these into a glass flask, so that the liquid completely covers the iron wire, plug the neck with cotton wool, and heat gently till dissolved. Add this solution to the following when the latter has cooled:—

Precipitated carbonate of calcium	120 grains.
Concentrated phosphoric acid	4 fluid drachms.
Distilled water	2 fluid ounces.

Mix and add—

Bicarbonate of potassium	9 grains.
Phosphate of sodium	9 grains.

Filter and set aside. Then take of—

Cochineal	30 grains.
Distilled water	7½ fluid ounces.

Boil for fifteen minutes and filter, pouring over the filter a sufficient quantity of distilled water to produce seven fluid ounces of filtrate.

To this add—

Refined sugar	14 ounces.

Heat till dissolved, and strain. When cold, add the former filtrate set aside, and a sufficient quantity of distilled water to make the whole measure one pint. Thus made, the syrup will contain in each fluid drachm about ½ grain of phosphate of iron and ⅘ grain of phosphate of calcium, with small quantities of the phosphates of potassium and sodium. It should be kept in bottles quite full.

Dose.—½ to 2 fluid drachms.

Syrupus Ferri, Quininæ et Strychninæ Phosphatum.
Syrup of the Phosphates of Iron, Quinine, and Strychnine.

Take of—

Strychnine, in powder	5 grains.
Concentrated phosphoric acid, sp. gr. 1·5	75 minims.
Distilled water	225 minims.

Dissolve, and add—
Phosphate of quinine. . . . . 120 grains.
Dissolve by the aid of a gentle heat, and add—
Syrup of phosphate of iron, sufficient to produce 1 pint.

Mix thoroughly. Each fluid drachm contains 1 grain of phosphate of iron, $\frac{3}{4}$ grain of phosphate of quinine, and $\frac{1}{3\frac{1}{2}}$ grain of strychnine.

Dose.—$\frac{1}{2}$ to 1 fluid drachm.

Syrupus Hypophosphitum Compositus.
Compound Syrup of Hypophosphites.

Take of—
Quinine (alkaloid) . . . . . 20 grains.
Strychnine . . . . . 1 grain
Distilled water . . . . . $\frac{1}{2}$ fluid ounce
Hypophosphorous acid, sp. gr. 1·136 . . . 1 fluid drachm or a sufficient quant.

Dissolve, filter and add—
Syrup . . sufficient to produce 5 fluid ounces.
Then add—
Syrup of the hypophosphites of calcium, manganese and potassium . . . . . 5 fluid ounces.
Syrup of hypophosphite of iron 10 fluid ounces.
Mix to produce 1 pint of syrup.

Each fluid drachm contains $\frac{1}{160}$ grain of strychnine and $\frac{1}{8}$ grain of quinine.

Dose.—$\frac{1}{2}$ to 2 fluid drachms.

Tinctura Benzoini Simplex.
Simple Tincture of Benzoin.

Take of—
Benzoin in powder . . . . . 2 ounces.
Rectified spirit . . . . . 1 pint.

Macerate for twenty-four hours with frequent agitation, then filter, and add sufficient rectified spirit, if required, to produce 1 pint.

Tinctura Bryoniæ.
Tincture of Bryony.

Take of—
Fresh bryony root*, Rectified spirit, Distilled water } of each a sufficient quantity.

Ascertain the percentage of moisture in the root by drying 100 grains of it over a water-bath. Bruise the remainder, after having calculated the moisture it contains, and reckon this as part of the water to form, with rectified spirit, a mixture equal in strength to proof spirit. Produce a tincture by macerating for seven days of such a strength as that 10 fluid ounces shall represent 1 ounce of the dried root.

Dose.—1 to 10 minims.

Tinctura Carminitiva.
Carminative Tincture.

Take of—
Cardamom seeds, bruised . . 600 grains.
Stronger tincture of ginger . $1\frac{1}{4}$ fluid ounces.
Oil of cinnamon . . . . . 100 minims.
Oil of caraway . . . . . 100 „
Oil of clove . . . . . 100 „
Rectified spirit, sufficient to produce 1 pint.

Macerate the cardamoms in 15 fluid ounces of the spirit for a week, decant, express and dissolve the oils in the mixed tinctures, making up to 1 pint with rectified spirit.

Tinctura Convallariæ.
Tincture of Lily of the Valley.

Take of—
Lily of the valley flowers and stalks,† dried in No. 20 powder . $2\frac{1}{2}$ ounces.
Proof spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in a percolator, and gradually pour proof spirit upon it until 1 pint of tincture is obtained.

Dose.—5 to 20 minims.

* *Bryonia alba*, Linné; *B. dioica*, Jacquin.
† *Convallaria majalis*, Linné.

Tinctura Coto.
Tincture of Coto.

Take of—
Coto bark,* bruised . . . . . 2 ounces.
Rectified spirit . . . . . 1 pint.

Macerate for seven days with occasional agitation; then press, filter, and add sufficient rectified spirit to produce 1 pint.

Dose.—10 to 30 minims.

Tinctura Ergotæ Ammoniata.
Ammoniated Tincture of Ergot.

Take of—
Ergot, in No. 20 powder . . . . 10 ounces.
Aromatic spirit of ammonia, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twelve hours; then pack in a percolator, and gradually pour aromatic spirit of ammonia upon it until 1 pint of tincture is obtained.

Dose.—10 to 60 minims.

Tinctura Erythrophlœi.
Tincture of Casca.

Take of—
Casca bark,† in No. 20 powder . . 2 ounces.
Rectified spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in a percolator, and gradually pour rectified spirit upon it until 1 pint of tincture is obtained.

Dose.—5 to 10 minims.

Tinctura Eucalypti.
Tincture of Eucalyptus.

Take of—
Eucalyptus leaves,‡ in No. 20 powder. . . . . 4 ounces.
Rectified spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in a percolator, and gradually pour rectified spirit upon it until one pint of tincture is obtained.

Dose.—15 minims to 2 fluid drachms.

Tinctura Euphorbiæ.
Tincture of Euphorbia.

Take of—
Euphorbia,§ in No. 20 powder . . 4 ounces.
Proof spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in a percolator, and gradually pour proof spirit upon it until one pint of tincture is obtained.

Dose.—10 to 30 minims.

Tinctura Hamamelidis.
Tincture of Hamamelis.

Take of—
Hamamelis bark,‖ in No. 20 powder 2 ounces.
Proof spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then

* A bark of unknown origin obtained from Bolivia. In flat or curved pieces about 1 centimetre in thickness, and of variable length. The taste is aromatic and very biting. The transverse section is of a cinnamon brown colour externally, and darker towards the inner surface.
† The bark of *Erythrophlœum guineense*, G. Don.
‡ *Eucalyptus globulus*, Labillardière.
§ The herb *Euphorbia pilulifera*, De Candolle, collected when in flower and carefully dried. The involucral glands of the perianth are without appendages. The mature seeds are minutely wrinkled.
‖ *Hamamelis virginica*, Linné.

pack in a percolator, and gradually pour proof spirit upon it until 1 pint of tincture is obtained.

Dose.—5 to 60 minims.

Tinctura Hydrastis.
Tincture of Hydrastis.

Take of—
Hydrastis,* in No. 60 powder . . 2 ounces.
Proof spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in a percolator, and gradually pour proof spirit upon it until 1 pint of tincture is obtained.

Dose.—20 minims to 1 fluid drachm.

Tinctura Iodi Decolorata.
Decolorized Tincture of Iodine.

Take of—
Iodine . . . . . 250 grains.
Rectified spirit . . . . . 5½ fluid oz.

Dissolve by the aid of a gentle heat. When cold, transfer to a stoppered bottle, and add of—
Stronger solution of ammonia 10 fluid drachms.

Keep the mixture in a warm place until decolorized, after which dilute it with—
Rectified spirit, sufficient to produce 1 pint.

Tinctura Pruni Virginianæ.
Tincture of Wild Cherry.

Take of—
Wild cherry bark,† in No. 20 powder 4 ounces.
Distilled water . . . . . 7½ fluid ounces.

Macerate for twenty-four hours in a closed vessel, and add—
Rectified spirit . . . . . 12½ fluid ounces.

Macerate for seven days; then press, filter, and add—
Proof spirit sufficient to produce 1 pint.

Dose.—20 to 60 minims.

Tinctura Quillaiæ.
Tincture of Quillaia.

Take of—
Quillaia bark,‡ in No. 20 powder . 2 ounces.
Rectified spirit . . . . . 1 pint.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in a percolator, and gradually pour rectified spirit upon it until one pint of tincture is obtained.

Tinctura Strophanthi.
Tincture of Strophanthus.

Take of—
Strophanthus seeds,§ reduced to
No. 30 powder, and dried at 110° F. 1 ounce.

Pack in a percolator, and moisten with pure ether (sp. gr. ·720). Macerate for twenty-four hours, then allow percolation to proceed, continuing the addition of ether until the fluid passes through colourless (about eight or ten fluid ounces suffice). Remove the marc from the percolator, and dry it, gradually heating it to 120° F. Again reduce it to powder, repack in the percolator, and moisten with rectified spirit. Macerate for forty-eight hours, then pour on successive quantities of spirit, percolating slowly, until one pint of tincture is obtained.

Dose.—2 to 10 minims.

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* The rhizome of *Hydrastis canadensis*, Linné.

† *Prunus serotina*, Ehrhart. The bark collected in autumn.

‡ *Quillaia saponaria*, Molina.

§ The seeds, deprived of the apical hairy appendage, of a species of Strophanthus growing in Eastern Africa, and usually referred to *S. Kombe*, Oliver. The seeds are plano-convex, of a greyish-green or pale-brown colour, 18 millimetres long and 4 millimetres broad in their greatest diameter, rounded at the base and tapering at the apex, covered with appressed silky hairs, which become much shorter towards the apex of the seed, and furnished on the flat side with a longitudinal ridge, disappearing below the middle of the seed.

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Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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MEETING OF THE BRITISH PHARMACEUTICAL CONFERENCE.

THE Twenty-fourth Annual Meeting of the British Pharmaceutical Conference was commenced in Manchester on Monday evening last by a Reception by the President, S. R. ATKINS, Esq., J.P., followed by a Conversazione held in the Grand Hotel, Manchester. There was a very large and representative gathering of pharmacists, many of them accompanied by ladies, and the general approval which has again been manifested in respect to this innovation of holding a social meeting as a preliminary to the business of the Conference will doubtless secure the promotion of the experiment of the last two meetings to permanent rank. A foretaste of the executive quality of the Local Committee was afforded in the admirable arrangements that ensured the enjoyment and comfort of every visitor. The company listened at intervals throughout the evening to a choice selection of music, vocal and instrumental, whilst for tastes in another direction a very fine collection of microscopes and slides had been brought together, mainly, we understand, by the efforts of Dr. THRESH and Mr. J. HART.

The Conference was held in the Chemical Lecture Theatre of Owens College, which was kindly lent for the purpose by the authorities of the College. On Tuesday morning, at about a quarter past ten, the chair was taken by the President, in the presence of a rather small attendance, which, however, rapidly increased, until the large lecture theatre was fairly full. The proceedings were commenced by Mr. G. S. WOOLLEY, who said that in the much regretted absence of Mr. WILLIAM SCOTT BROWN through ill-health, the duty fell upon him to welcome the Conference to Manchester on behalf of the local pharmacists. This he did in felicitous terms, and was followed by Professor LEECH, who also greeted the members of the Conference on the part of the College authorities, saying that they had already shown their interest in pharmacy by establishing a complete course of pharmaceutical education in connection with Owens College. The welcome having been acknowledged by the Chairman, a list of delegates from various associations to the Conference and several letters of apology for non-attendance were read.

The Annual Report of the Executive Committee, which will be found on another page, was then read.

Annual Report.

A large portion of the report was devoted to secretarial changes. A much smaller portion contained the important announcement that the Formulary Committee appointed at the last meeting of the Conference had, in conformity with the terms of its appointment, presented to the Executive a "draft of what it recommends for publication as the first edition of an Unofficial Formulary." These results were now laid before the Conference, with a recommendation that the Formulary Committee should be re-appointed. The Treasurer's Financial Statement showed that the members' subscriptions during the past year had amounted to £611 13*s.* 9*d.*; but that sum, supplemented by the income on account of the 'Year-Book' and Index, does not appear to have been nearly sufficient to maintain an equilibrium between the receipts and expenditure, and we gather from the statement that if all outstanding accounts had been paid the cash balance in favour of the Conference on June 30 last would have been about £150. The adoption of the Report and Financial Statement was moved by the President, seconded by Mr. KEMP, and agreed to unanimously without discussion. It is not probable that any useful purpose would have been served by an impromptu discussion of the work of the Formulary Committee, whilst it might have involved a considerable loss of time; but probably few who took part in the vote quite realized that they were sanctioning the publication of a draft they had not yet seen as the first edition of the Unofficial Formulary. This, however, was the subsequent ruling of the President.

Immediately after the adoption of the report the President brought before the members a suggestion that as the German Apotheker-Verein was then holding its annual meeting in Munich, a telegram of friendly congratulations from the Conference should be forwarded to that body. The suggestion was at once adopted with acclamation.

Telegram to the German Apotheker-Verein.

The way was now cleared for the Presidential Address, and that it proved to be an unusually eloquent oration will with those who are acquainted with Mr. ATKINS's powers *va sans dire*. The dominant theme was suggested, as in innumerable other cases during the present year, by the "Jubilee." Fifty years of history in social life, in scientific progress, in craft organization! The field was not a narrow one, and time allowed only for the plucking of a handful here and there, certainly not for anything like a complete reaping. Manchester was appropriately chosen to illustrate the advance in social life. The score of express trains running daily between that city and the metropolis that have grown out of the tentative period of railway locomotion; the increase in the traffic between Liverpool and Manchester, which promises to bring to the inland city the privileges of a sea-port; the development of the industries that have made Manchester a household word throughout the world; and last, but not least, the increasing love for education, literary, technical and artistic, which has culminated in the Victoria University and the Exhibition at Old Trafford: all these were briefly mentioned. The speaker next invited his audience to follow him in a brief review of the Victorian era, as it more especially affected them as pharmacists, and he chose for his first topics the half century of chemistry and botany. But it must be confessed that this portion of the review was somewhat meagre, notwithstanding that it antedated the Victorian era considerably. Such a text indeed would have sufficed for many sermons and was decidedly too unwieldy to be moulded into a division of one. The President was more fortunate when he turned to another topic, the part played by the Pharmaceutical Society of Great Britain since its establishment in 1841. "The story has been well told" he said, "but I feel deeply, and at times sorrowfully, that it has not received the recognition it deserves." Emphatically, however, he insisted that disinterestedness was the prominent characteristic of those metropolitan pharmacists who headed the new movement; possibly, had he not himself have been so intimately mixed up with its more recent history, he might have applied the same epithet to those who still lead it on. A panegyric followed of the earlier leaders—JACOB BELL, ALLEN, PAYNE, SAVORY, MORSON, and DINNEFORD, not omitting the still living THOMAS HYDE HILLS and GEORGE WEBB SANDFORD—and then the speaker proceeded to consider how far the ostensible objects of the organization—education, protection of interests, and relief of distress—have been attained. The Act of 1868, it was pointed out, has rendered examination a necessary condition of registration, and for nearly twenty years the relative proportions of examined and unexamined men have been changing. As a means of fitting candidates to pass the qualifying examination Mr. ATKINS evidently looks back with regret to the time when a seven years' apprenticeship was a more important factor in the production of skilled pharmacists than now. No doubt where the master himself was competent the old-fashioned apprenticeship afforded that opportunity for acquiring practical knowledge which is an indispensable preliminary to the proper application of the theoretical. But it must be remembered that although competent pharmacists may have been more ready to undertake the responsibilities of tutor fifty years ago than they are now, such men were not by any means ubiquitous; and in those days—as indeed it is still—it was not every "chemist and druggist" who took an apprentice—and his premium—who troubled himself, or was even competent to teach pharmacy. Mr. ATKINS

The President's Address.

recognizes that education continues to be the question of the hour, but he professes great confidence in the law of supply and demand; this confidence, however, did not prevent him from admitting, in the next sentence, that the voluntary principle has, in this respect, proved inadequate. Much of the present want of success in the examination room is attributable, in Mr. ATKINS'S opinion, to the unsatisfactory condition of middle class education in this country, an opinion in which those who know the facts best will coincide. But notwithstanding this and other drawbacks, he holds that the hope of pharmacists in the future lies in cultivating the scientific rather than the merely trading side of pharmacy, for in this direction, from the nature of things, competition will be less acute, while remuneration for service given will be on a higher scale. Turning next to the history of the Conference it was pointed out that this body exists chiefly and pre-eminently for the prosecution of scientific research, and this was defined as "the investigation and revelation of all the facts and phenomena of universal nature." A big "blue list" truly, and with a share in this wealth of subjects the Conference need never come to an end through want of something to do. A few paragraphs were then devoted specially to the records of the past twelve months, and an eloquent peroration brought the address to a close. The burst of applause that greeted the speaker upon sitting down testified to the enjoyment which the meeting found during the delivery of the address, to which also Mr. BENGER and Dr. SYMES gave vocal expression in moving and seconding the vote of thanks that was unanimously accorded.

The reading of papers then commenced, the first communication read being a report by Mr. W. ELBORNE on Strophanthus and Strophanthin, which was based on a research aided by a grant from the Conference, and was described as a continuation of a paper read by the author before the Pharmaceutical Society in March last. Mr. ELBORNE has operated upon the greenish-brown variety of the seed known commercially as *S. Kombé*. The results obtained by him do not altogether correspond with those reported by other workers; for instance, the quantity of fixed oil obtained by him from the seeds was only about two-thirds of the quantity obtained by Mr. GERRARD and Mr. HELBING. Such differences, however, he considers may be attributable to variations in the seeds operated upon. But a more important point appeared in his statement, that although in treating the seeds with absolute alcohol he obtained a larger yield of strophanthin than that reported by other observers, the seeds were still very imperfectly exhausted. He appears also to have observed some variation from the reported behaviour of the glucoside with tannic acid. The author criticised Mr. GERRARD'S process for the preparation of strophanthin, and suggested as an improvement either of two alternative processes, in both of which the seeds are first exhausted with water containing 10 per cent. of alcohol instead of absolute alcohol, and the use of tannic acid as a precipitant is avoided. He also suggested a modification in Professor FRAZER'S formula for the preparation of tincture of strophanthus. In the discussion that followed the reading of this report, Mr. GERRARD referred to the statement by Professor FRAZER that strophanthin is crystallizable, and said that he also had succeeded in preparing it in the crystalline form, but the quantity was very small, and for some reason the compound rapidly decomposed. He also mentioned that in some oil from the seeds, after standing a time, he had noticed a crystalline separation, which ought to be the subject of experiment. Dr. SYMES, referring to the tincture as being the preparation that would probably be used for the present, thought the preliminary treatment of the seeds with ether was hardly necessary, as proof spirit exhausted them without removing any appreciable quantity of oil. It was objected, however, by Mr. ELBORNE that such a preparation becomes cloudy upon standing.

Elborne on Strophanthus.

Some contributions to the knowledge of Catha Leaves, by Professor FLÜCKIGER and Mr. T. E. GEROCK, next came under the attention of the meeting. The greater part of this lengthy paper was of the historical and antiquarian nature that characterizes many of the writings of the senior author. Only the portion recording the results of the chemical examination therefore, was read by Mr. NAYLOR. It appears that the first scientific notice of the plant was contributed rather more than a century ago by the Swedish botanist and explorer, FORSKAL, who reported that the Arabs ate the leaves greedily on account of their stimulating powers and the wakefulness they promoted; also that they believed the plague would not invade a place where the tree was cultivated and that a man carrying a twig of catha in his bosom might safely go among the infected. A number of other quotations are given in the paper, tending to show that catha leaves are used by the natives of Arabia and Abyssinia in a similar manner and for similar purposes as coca leaves in South America. The results of the chemical examination by the authors of a sample of catha are recorded in the last two or three paragraphs of the paper. About three pounds of the leaves were exhausted with water containing oxalic acid, the liquid neutralized with lime and shaken with light petroleum; the greater part of the petroleum was distilled off and the residue shaken with dilute hydrochloric acid; the acid solution was heated with lime in excess and then shaken with ether, which on evaporation left about half a gram of a thickish oily yellowish matter that readily dissolved in acetic acid, the solution giving precipitates characteristic of alkaloids. A watery solution of the

Flückiger and Gerock on Catha.

substance reddened phenolphthalein paper, but the redness quickly disappeared, in consequence, it is supposed, of the volatilization of the alkaloid, which it is proposed to call "katine." A crystalline acetate of katine was also stated to have been obtained. The authors confirmed previous statements as to the absence of caffeine.

Williams on Aconitine.

Continuing his experiments on the Preparation of Aconitine, Mr. JOHN WILLIAMS has worked out a new process, a description of which he now communicated to the Conference. It consists essentially in exhausting with amyl alcohol the coarsely-ground root of *Aconitum Napellus* dried at a moderate temperature, shaking the amylic solution with dilute acid and water, and precipitating the acid liquor with sodium carbonate. The crude alkaloid is then dissolved either in ether or alcohol and allowed to crystallize. Mr. WILLIAMS especially insists upon the necessity of ensuring that the root operated upon is derived from *A. Napellus*, and he uses a fusel oil free from ordinary spirit. It will be noticed that Mr. WILLIAMS does not acidulate the percolating menstruum with tartaric or any other acid. Mr. WILLIAMS recommends that in the next edition of the Pharmacopœia the alkaloid in its crystallized state should be authorized in the place of the amorphous aconitine now official. In reply to Mr. HOLMES, the author said that he was not quite sure as to the quality of the roots he had operated upon, as he had been dependent for his supply upon the ordinary market. But when Mr. HOLMES had carried out the experiment he had undertaken on behalf of the Conference, and was in a position to supply aconite roots of undoubted botanic origin, he would be glad to repeat his experiments upon them. In reply to another question Mr. WILLIAMS said he believed the yield of crystallized aconitine by this process was larger than by any other, probably because there was not so much loss through decomposition.

The Conference then adjourned for luncheon.

On resuming, the second sitting of the Conference was commenced by the reading of a paper on the

Ransom on Ipecacuanha.

Estimation of Emetine in Ipecacuanha, by Mr. F. RANSOM. The principal novelty in this paper was the suggested use for the percolation of the root of chloroform rendered alkaline by shaking it with strong solution of ammonia. The alkaloid is removed from the percolate by means of dilute sulphuric acid, and estimated with MAYER'S reagent. The author has ascertained that contact with the ammoniated chloroform does not decompose the alkaloid. Ten samples of root tested by this process yielded proportions of emetine varying from 1·3 to 2·3 per cent., the average strength being 1·66. At the conclusion of the paper, Mr. NAYLOR expressed some surprise at the high results obtained by Mr. RANSOM, and remarked that hitherto no published process had quite satisfied him, as they all, in his hands, had yielded varying results.

Moss on the Mackay Bean.

The enormous bean known as the Mackay Bean, the seed of *Entada scandens*, was the subject of the next communication, by Mr. JOHN MOSS. It consisted of an account of a chemical investigation of the seed made with the object of isolating a poisonous principle that it was alleged to contain. No very definite result, however, has been arrived at, beyond establishing the probability of the occurrence of saponin in the aqueous extract, and the obtaining of three or four microscopic crystals, which it is hoped may be the beginning of a crop that will eventually be large enough to allow of their proper examination. Some question having been raised as to whether the substance occurring in the aqueous extract was really saponin, Mr. HOLMES remarked that the root of the plant is used in the Philippines as a washing material.

Maben on Blaud's Pill.

The already bulky literature on BLAUD'S Pill next received an addition in the shape of a report by Mr. T. MABEN, which may be looked upon as a kind of bye-product of the Formulary Committee. Mr. MABEN is one of the majority who believe that the intention of the prescriber in ordering BLAUD'S pills is to administer ferrous carbonate, and that the ferrous carbonate should be formed before the ingestion of the pill. Notwithstanding the authority of the Codex, Mr. MABEN prefers to use the crystalline sulphate, and he trusts mainly to a coating of gelatine to prevent oxidation after the pill is made. The formula recommended by Mr. MABEN is practically the same as that adopted in the Unofficial Formulary, which will be found on another page. Mr. MARTINDALE said that Mr. MABEN'S formula allowed of presentable pills being prepared quickly, but they would not keep well. He expressed a preference for the iron pills of the Pharmacopœia, but it was pointed out by Dr. SYMES that medical men continue to order BLAUD'S pills, and pharmacists have to prepare them. In reference to a suggestion by Mr. MARTINDALE that better results were obtainable by heating the mass than by beating it, Mr. NAYLOR remarked that by beating he had obtained a product containing pill for pill more ferrous carbonate than the official pill.

Braithwaite on Vesicating Beetles.

The next note, on Two Species of Vesicating Beetles from South Africa, by Mr. J. O. BRAITHWAITE, was another communication of practical value. It described the results of an examination of some "blistering flies" that had recently been consigned from South Africa. The sample consisted of two species of *Mylabris*, which have been identified as *M. bifasciata* and *M. lunata*. The author reported that he had ascertained that the former of these is extremely rich in cantharidin, containing more than twice as much as *Cantharis vesicatoria*, and he suggested that

as the beetle is plentiful at the Cape it might prove an economic source of the vesicant. *M. lunata* proved to be much poorer in cantharidin. After the paper had been read, Mr. Moss stated that another species of *Mylabris* is at present used as an important source of commercial cantharidin.

A very brief note was then read by Mr. W. ELBORNE, in which he called attention to samples of English-grown roots of *Rheum officinale*, pointing out the great similarity in appearance and general characters existing between them and the dark-veined variety of the East Indian imported drug.

Elborne on English-grown Rhubarb.

The object of the next paper read, which was by Mr. H. HELBING, was to add Oil of Evodia to the list of deodorants of iodoform. The oil, which is derived from the fruit of the *Evodia fraxinifolia*, a rutaceous plant, native of Nepal, was described as having an exceedingly agreeable and intense odour similar to bergamot. Its specific gravity does not exceed ·840, and it is soluble in ether and alcohol and has a pungent taste. The fruit on distillation yields about 4 per cent. of the oil. Some conversation arose as to a possible supply of the oil, but this was somewhat checked by the doubt expressed by the President, after examining the samples, whether the oil answered to the claim put forward on its behalf.

Helbing on Oil of Evodia.

Cryptopine and its Salts are substances not very familiar as a rule to even accomplished pharmacists, although some attention has been directed recently to the alkaloid in respect to its remarkable gelatinizing property. In the paper next read, Dr. KAUDER contributed the results of his chemical experience in preparing the alkaloid and its salts. The physiological history of the compounds, however, does not seem to have been yet begun.

Kauder on Cryptopine.

This brought the second sitting of the Conference and the first day's business to an end, a large number of members upon the adjournment of the meeting proceeding in carriages provided for the purpose to visit the Jubilee Exhibition.

The third sitting of the Conference was held on Wednesday morning, the proceedings commencing with the reading of a paper on the Relation of Pharmacy to Medicine by Professor LEECH, Lecturer on Materia Medica in Owens College. At first it seemed as if the paper was intended as a panegyric upon wholesale-made "palatable" preparations of medicine; but after a time this found an explanation in the evident impression of the speaker that the "new commercial industries" that have arisen and "have absorbed some of the work formerly done by individual pharmacists" always result in an output of definite preparations of known composition. According to Professor LEECH "the present system "of education leads medical men to prefer ordering "medicines which they know are made up in a "palatable form to devising combinations which "may not be so pleasant for their patients as they "would wish;" whilst "a large proportion of those "on whom powers to practise are conferred have "little idea of the best methods of ordering "medicines or of the physical results they may "obtain by the association of the drugs they "wish to give." This necessity for a devolution of responsibility, however, though it may be urgent, can hardly be fairly charged against the pharmacist. We think it may be correctly asserted that it will be only necessary for the medical profession to formulate exactly what it wants to ensure a supply as far as is possible from the ordinary pharmacist, and that the difficulty is evaded rather than overcome by the prescribing of "palatable" or "convenient" preparations the exact composition of which in many cases is known only to the manufacturer. As Professor LEECH'S argument was developed, however, it became evident that his demand is for pure medicaments of definite or known composition, and the necessity for these he illustrated experimentally in a most interesting manner, by showing the influence of a very dilute solution of veratrine on muscle. It seems to us that a greater part of the author's argument might be appropriately addressed to the representatives of the medical profession. If it be true that "the want of reliance on the uniformity of our "official preparations is leading medical men to those "large houses in America and Germany, as well as in "England, who guarantee that their compounds are "of a definite strength," it is desirable that the mischief should be at once brought under the notice of the medical body that at present entirely controls the formulæ of the Pharmacopœia. It is impossible, however, just now to do justice to the many points that are worthy of discussion in this most interesting address, but we shall probably refer to them when the address is published *in extenso*. Meanwhile, we entirely endorse the opinion, that "if pharmacy is "to hold its own, each pharmacist must be in the "future the guarantor of the purity of the medicines "he dispenses, not the mere distributor."

Leech on Relation of Pharmacy to Medicine.

The Estimation of Small Quantities of Salicylic Acid in Wines, etc., was the subject of the next paper, which was by Mr. W. H. Ince. The method preferred by the author is to distil the liquid after acidulating it with sulphuric acid, reject the first portion passing over, then treat a definite quantity of the subsequent distillate with a 10 per cent. solution of mercuric nitrate in nitric acid or ferric chloride, and compare the liquid colorimetrically with solution of salicylic acid of known strength treated with the same reagent. The author states that he has found distillation in a current of steam "a satisfactory method of extracting a definite quantity of the acid from a definite volume of wine or similar body.'

Ince on Testing for Salicylic Acid.

In a note on the Testing and Purification of Hydrochlorate of Cocaine, Mr. JOHN WILLIAMS next attempted to deal with a difficulty presented by this now widely used alkaloid. The purification process recommended by the author depends upon the almost absolute insolubility of hydrochlorate of cocaine in ether, in which cocaine itself is freely soluble, and the fact that most if not all of the impurities appear to be soluble in ether even when converted into hydrochlorate. The cocaine hydrochlorate to be examined is dissolved in the smallest quantity possible of absolute alcohol and to this solution is added about six times its volume of pure ether; after shaking several times the mixture is allowed to stand a few minutes and the crystalline precipitate is then thrown on a calico filter, squeezed, spread on blotting paper and allowed to dry. The cocaine hydrochlorate thus purified is said to be much improved and free from the mousey odour so often complained of. In the discussion that followed the reading of the paper Mr. CHRISTY referred to the fact that a considerable quantity of crude cocaine now received in this country from South America pays a visit to Germany for purification, and said that the publication of Mr. WILLIAMS'S paper would appear to render this unnecessary in future. The question was also raised as to the preservation of cocaine in solution, and Dr. TICHBORNE stated that a slightly acid solution of salicylate of cocaine would keep good for twelve months.

Williams on Hydrochlorate of Cocaine.

Mr. HELBING next read a paper entitled Pharmaceutical Notes on some Synthetical Compounds recently introduced into Medicine. The paper was mainly a compilation of statements which have already been published in this Journal concerning the numerous organic compounds with which continental physicians and chemists have recently inundated the materia medica. It contained also some useful information as to the best methods of dispensing some of these compounds, and as the paper was illustrated by samples of several of the substances referred to it was much appreciated. Nevertheless, a perhaps too captious critic might suggest that it was not without objectionable features as a paper read before the Conference.

Helbing on Synthetical Compounds.

The subject of Camphor Oil was next brought before the Conference in a paper by Mr. P. MACEWAN, who having examined numerous samples of the oil during the last two years, has been struck with the great range of quality they exhibited. Some were almost colourless, others very dark, and their other physical characters showed great variations. Some experiments have led him to the conclusion that high specific gravity and dark colour are indicative of the absence of camphor. Mr. MACEWAN considers it desirable that camphor oil should be brought to approximate uniformity before it reaches he hands of the retailer, by excluding the dark and heavy oils, bulking the remainder and submitting it to distillation to get rid of all that will distil below 170° to 175° C., which would be still useful for varnish making. Mr. Moss mentioned that in the distillation of crude oil, which is carried out to a considerable extent for the sake of the camphor it contains, a fraction is obtained resembling safrol, and he believed that a great proportion of this constituent finds its way into commerce as oil of sassafras. Another portion of the distillate, he had been informed, resembled eugenol, the heavy constituent of oil of cloves, and although occurring in small relative proportion the total yield is large, as the quantity of the oil distilled is enormous.

MacEwan on Camphor Oil.

The next paper, on Some Fundamental Errors in the British Pharmacopœia, by Dr. C. R. C. TICHBORNE, commenced with an admission that as a whole very few books containing so much condensed work are so free from errors as the British Pharmacopœia. The "fundamental errors" referred to and illustrated in the paper were those due to the fact that whilst the Pharmacopœia provides that all measurements shall be made at 60° F., the imperial measures used are graduated at the legal temperature of 62° F., and the metric measures are properly graduated at 39·2° F.

Tichborne on Errors in Pharmacopœia.

Another Spurious Cubeb was the subject of a histological paper by Mr. KIRKBY. It appears to agree more closely with FLÜCKIGER and HANBURY'S description of *Piper crassipes* than the false cubebs described by Mr. KIRKBY in this Journal (vol. xv., 653), which has been referred to that species. To distinguish them, therefore, he at present speaks of the earlier one as the short-stalked variety. Mr. HOLMES mentioned the interesting fact that he had recently examined a sample of cubebs of the best quality he could obtain, and that he had found it to contain the different spurious "cubebs" that have been described, and he was inclined to believe that the cubebs of the present day consist of mixtures of genuine and spurious fruits. Dr. SYMES said that many samples of powdered cubebs when triturated with water showed a considerable separation of gritty and sandy matter, and one sample of powder yielded to him upon incineration as much as 12 per cent. of ash.

Kirkby on Spurious Cubebs.

The next paper, by Dr. G. ARMSTRONG ATKINSON, on the Chemistry of the Nitrites and of Nitroglycerine, was supplemental to one by the same author on the "Pharmacognosy of the Nitrites," that appeared in this Journal last year (*Pharm. Journ.*, [3], xvii., 1). Referring to the unsuitability of nitrous acid for medicinal use on account of its instability in contact with water, the author stated that he has found experimentally that watery solution of nitrous acid of the strength of 1 in 1000, kept in a stoppered bottle half filled, is reduced in strength in a few hours to

Atkinson on the Nitrites.

1 in 3000, the decomposition being into nitric acid, nitric oxide and water. A preparation sold as "acidum nitrosum," and sometimes used in medicine, was pronounced to be merely a solution of a variable proportion of nitrous acid in nitric acid. The only possible form in which, in the author's opinion, moderately pure nitrous acid can be conveniently exhibited as a medicine is as an aqueous solution not stronger than 1 in 3000, with a little glycerine added to retard decomposition. But the free acid presents no advantages over nitrite salts, which are readily decomposed by the acid of the gastric juice, whilst the nitrites of sodium and potassium are readily soluble in water and the solutions are perfectly stable if kept free from fungoid growth; the sodium salt is, however, considered the more suitable for therapeutic use. Nitrite of ethyl, incidentally stated to be the earliest known nitrite, was next considered, especially in reference to the question whether nitric acid, free or combined, occurs in it. This was answered in the affirmative, all the specimens examined having contained it, as well as old samples of spirit of nitrous ether from which all nitrite had disappeared. Nitrite of amyl, when recently prepared, has been found by the author to contain usually from 75 to 80 per cent. of the actual nitrite; all the samples examined contained at least traces of nitrate and some old ones contained considerable quantities. In the latter part of the paper some points in connection with nitroglycerine were discussed, especially its qualitative and quantitative analysis. This concluded the business of the third sitting.

The fourth and last sitting was commenced with the reading of a paper on the Chemistry and Pharmacology of some of the Morphine Derivatives, by Messrs. Dott and Stockman, which although containing a record of much valuable and interesting work hardly lends itself to intelligible condensation. The first compound dealt with was methylmorphine, or codeine, and it was stated that the alkaloid artificially prepared from morphine, and which has been already shown to correspond with codeine from opium in chemical and physical properties, agrees with it also in physiological action. In dimethylmorphine the chemical change is attended by a complete modification of the symptoms characteristic of the morphine group. Ethylmorphine does not differ essentially in physiological action from the corresponding methyl base, codeine; but the introduction of the acetyl group slightly increases the narcotic and tetanizing action.

Dott and Stockman on Morphine Derivatives.

The next paper read was a Note on the Pharmacy of Logwood, by Mr. Louis Siebold. The object of this note was to deal with the questions:—What is the best logwood for use in pharmacy? What is the nature and condition in which this wood is intended by the authors of the Pharmacopœia to be employed? Are these intentions fulfilled in practice? In reference to the first question the author thought that Campeachy or Honduras was much more suitable for use than the inferior kinds obtained from San Domingo and Jamaica. As to the condition in which the wood was to be used the Pharmacopœia was silent, and ignored the fact that the wood in logs and that ordinarily sold in chips or in the form of a coarse powder were most essentially different from each other from a chemical point of view, since the ground wood or chips as met with in commerce had undergone a long process of fermentation by being laid up with water in heaps and exposed to the air for weeks. The great difference between the two was well known to those engaged in dyeing and calico-printing, and to technical chemists acquainted with these processes; but it was little known to and not at all appreciated by pharmacists. The author fully explained the difference in the chemical nature of the two woods, and expressed the opinion that the fresh or unfermented wood ought only to be used in pharmacy, the aged or fermented wood being very unsuitable for the decoction and the extract, especially for the latter, both from a pharmaceutical and from a medical point of view. He had no doubt in his mind that the framers of the Pharmacopœia meant the unfermented wood, as this alone had the sweetish taste alluded to in the characters. The last question he answered in the negative, asserting that fermented chips were almost exclusively used by pharmacists and wholesale houses for the B.P. preparations. Unfermented chips were rarely met with in commerce, and, to his knowledge, were never sold to retailers. He thought that pharmacists or wholesale druggists should prepare their own extract, as that imported so largely from France and America was not pure enough for pharmaceutical purposes. He would recommend in the place of the extract a liquor hæmatoxyli, representing its own weight of wood, which after settling was an elegant and very permanent preparation. He gave full details as to how this should be made.

Siebold on Pharmacy of Logwood.

Mr. Siebold also read a Note on the Application of Dyewoods in Chemical Analysis. He said that much had been written regarding the application of logwood tincture for the detection of alum in bread and of traces of heavy metals in potable water; but it had never been properly pointed out what kind of logwood should be employed for such purposes. He recommended the use of aged or fermented wood for the preparation of the tincture intended for testing, since its indications were far more delicate. He showed experimentally how this test could be made to show the presence of one part of copper in 4,000,000, one of aluminium in 17,000,000, and one of tin in the same proportion of water; also, how it should be best applied for the detection of alum in flour and bread. He also warmly recommended the

Siebold on Logwood as a Reagent.

fustic test described by GOPPELSROEDER for the detection of traces of aluminium in colourless liquids.

Next came a practical paper on the Examination of Cocoa Butter, by Mr. E. J. MILLARD. It at first dealt with the statement in the British Pharmacopœia that the melting point occurs "usually between 30 and 35° C.," the author affirming that starting with an original sample of pure cocoa butter, the melting point of which was 33° C., he had found that the addition of as much as 10 per cent. of paraffin, wax or tallow, only varied the melting points slightly outside the limits officially given as "usual." Better results were obtained with the test given in the United States Pharmacopœia, which depends upon the behaviour of the fat dissolved in ether and submitted to different degrees of temperature. Eighteen commercial samples were examined according to this test and only two came under even the shadow of suspicion.

Millard on Cocoa Butter.

In a communication on Quinological Work in the Madras Cinchona Plantations, Mr. DAVID HOOPER supplied another convenient summary of results obtained in further experiments carried out by him in his capacity of quinologist to the Madras Government. The first series of twelve analyses referred to showed that bark from trees of the same age and growing in the same situation might vary in alkaloidal strength, the figures ranging from 1·75 per cent. to 3·90 per cent. of quinine, and from none to 0·16 per cent. of quinidine. It also seems probable that there is no advantage in raising only one stem from a coppiced tree. Bark from the same twelve trees, examined in each consecutive month, showed that in the six months next following the original stripping there was a decrease of alkaloids in the bark left, as if the tree had suffered in this respect from the shock of the operation ; but in the seventh month recovery had well set in, and by the twelfth the bark was richer than it had been a year before. Incidentally it was also observed that March is the month in which cinchona bark appears to be richest in alkaloids. Some further experiments as to the effect of manuring cinchona trees seem to show that bone manure and cattle manure are best suited for the purpose, though the improvement of the bark in quinine was in no case more than 14·58 per cent. Another experiment as to the extent to which renewal of bark can be profitably carried appears to show that the maximum in the case of a hybrid Ledger plant had been reached with the third year's renewal, although the fourth renewal still resulted in a rich bark.

Hooper on Cinchonas.

The last paper read was a note on Crude Carbolic Acid and its Substitutes, by Mr. A. H. ALLEN. The author commenced by referring to the elastic manner in which titles suggestive of carbolic acid are frequently applied to preparations from which that substance is entirely absent. But the evident object of the paper was to bring under the notice of the Conference a product that is now obtained in enormous quantities in the condensation of the waste gases from blast furnaces consuming bituminous coal, which according to the author consists of phenoloid bodies resembling more closely the creosotic products from wood tar than the coal tar acids. This product, for which the commercial name of "neosote" has been adopted, was described and exhibited.

Allen on Neosote.

The President then in appreciatory terms referred to the work done by the Unofficial Formulary Committee, especially referring to the services rendered by the Chairman, Mr. W. MARTINDALE, and the Secretary, Mr. W. A. H. NAYLOR. He concluded by moving the reappointment of the Committee. The motion was seconded by Mr. J. WILLIAMS and agreed to unanimously.

Unofficial Formulary Committee.

The presentation of the Gift of Books provided by the BELL and HILLS Fund was then made by the President, and acknowledged by Mr. WILKINSON, as Vice-President of the local Association.

The President announced that, following the usual custom, the Conference would meet next year in the same place as the British Association, and that would be the city of Bath.

The election of officers for the ensuing year then took place by the tendering of a single vote for the list proposed by the Executive Committee, which was as follows :—

President.—Mr. F. B. Benger.

Vice-Presidents.—Messrs. M. Carteighe, C. Symes, S. Plowman and W. Martindale.

Treasurer.—Mr. C. Umney.

Honorary General Secretaries.—Dr. J. C. Thresh and Mr. W. A. H. Naylor.

Committee.—Messrs. W. Allen (Dublin), M. Conroy (Liverpool), R. H. Davies (London), D. B. Dott (Edinburgh), A. W. Gerrard (London), T. Maben (Hawick), N. H. Martin (Newcastle), F. Ransom (Hitchin), and G. S. Woolley (Manchester).

Auditors.—Messrs. W. Wilkinson (Manchester), and E. J. Appleby (Bath).

A vote of thanks to the Local Committee, and especially to Messrs. WOOLLEY, BENGER, HART, KEMP and WILKINSON, for the manner in which they had carried out the arrangements, was moved by Mr. SCHACHT, seconded by Mr. MARTINDALE and carried by acclamation. It was acknowledged by Mr. WOOLLEY, Mr. BENGER and Mr. WILKINSON. This was followed by a hearty vote of thanks to the authorities of Owens College, which was moved by Mr. R. REYNOLDS, and seconded by Mr. D. B. DOTT. Still another vote of thanks was accorded to the Executive Committee of the Jubilee Exhibition for its courtesy in inviting the members of the Conference to be present at a Conversazione.

The proceedings terminated with a hearty vote of thanks to Mr. S. R. ATKINS for the admirable way in which, as President, he had conducted

the business of the meeting. This was moved by Mr. CONROY, and seconded by Mr. BALKWILL, and after having been carried with great applause, was acknowledged in suitable terms. This brought to a close the business of one of the most successful meetings of the Conference, which was also the most numerously attended, the number signing the attendance book having been 249.

Early on Thursday morning the weather was fine enough to have made the excursion to Matlock Bath a perfect success if it could have been trusted to continue throughout the day; but even before the time appointed for meeting at the Central Railway Station heavy, threatening clouds obscured the sun, and made the prospect less encouraging. Nevertheless, a large proportion of the Conference visitors gathered together and took their places in the special train provided for conveying them to Matlock, where the programme which had been arranged for their entertainment was carried out very successfully notwithstanding some sharp showers of rain.

THE BRITISH ASSOCIATION MEETING.

THE unprecedented success that has marked the attendance at the meeting of the British Pharmaceutical Conference in Manchester, has been proportionately realized by the meeting of the British Association, for the total number of members who had entered their names up to the evening of Wednesday was no less than 3568, or more than one thousand in excess of the number present at the meeting of the previous year. The first meeting of the General Committee was held on Wednesday in the Committee rooms of Owens College, the Treasurer, Professor A. W. WILLIAMSON, presiding in place of Sir WILLIAM DAWSON, who had telegraphed from Canada expressing his regret that he could not be present on the occasion. The Report of the Council was read by Sir DOUGLAS GALTON, one of the General Secretaries, dealing with several subjects which had been recommended for consideration, and on the motion of Sir HENRY ROSCOE, seconded by Sir RAWSON RAWSON, the report was adopted. The Treasurer's Report was then read, showing that the balance brought forward from the Birmingham meeting amounted to £1,869, and that the grants which had been made during the year in aid of scientific research amounted to £1,186. The meeting on Wednesday evening at the Free Trade Hall, to hear the inaugural address of the new President, was very numerously attended, and there were present an unusually large number of scientific men from abroad. Professor WILLIAMSON explained the absence of the retiring President, Sir WILLIAM DAWSON, and in welcoming Sir HENRY ROSCOE as his successor, referred briefly to the noble services he has rendered to the cause of the advancement of learning, congratulating him on the well merited aknowledgment they had received, and the Association in having so worthy a President. Sir HENRY then proceeded to deliver his inaugural address, part of which appears in the present number, and it may be commended to the careful perusal of those who were not fortunate enough to hear it delivered as being a most able and interesting exposition of the achievments of scientific investigation during the last fifty years.

British Pharmaceutical Conference.

TWENTY-FOURTH ANNUAL MEETING.

The Twenty-fourth Annual Meeting of the Conference commenced its sittings on Tuesday, August 30, in the Chemical Theatre of the Owens College, Manchester; the President, S. R. Atkins, Esq., taking the chair shortly after 10 o'clock.

Mr. G. S. WOOLLEY opened the proceedings by offering, on behalf of the pharmacists of Manchester and the district, a cordial welcome to the Conference on its first visit to Manchester. At the same time he expressed the hope that the meeting would prove to be, as it promised, a very successful one; and that the arrangements made by the Local Committee would render the visit to Manchester both interesting and agreeable. His pleasure in standing forward on this occasion was somewhat marred by the thought that the gentleman whose place he occupied, Mr. William Scott Brown, was prevented by the state of his health from being present. Those who knew Mr. Brown best knew how delighted he would have been to have stood there and welcomed the Conference. The pharmacists of the district owed Mr. Brown a large debt of gratitude, for whenever any movement was on foot for the progress of pharmacy or the welfare of pharmacists Mr. Brown had always been in front. After acknowledging the kindness of the authorities of Owens College, and of the Executive Committee of the Royal Jubilee Exhibition, who had placed at the disposal of the Local Secretary a number of tickets for the Conversazione on Thursday evening, he remarked that the Executive Committee had determined to avail themselves of the facilities for studying the industries of the district in the machinery annexe of the Exhibition rather than to seek for opportunities of visiting various works, and he believed those who visited the Exhibition would be of opinion that the Committee had in this matter acted for the best. In conclusion he trusted that every member would carry away very pleasant recollections of the visit to Manchester.

Professor LEECH said he had great pleasure on behalf of the authorities of Owens College, as well as his own, in welcoming the Conference. The authorities of the College had great pleasure in putting at their disposal all the accommodation required, and were wishful to do everything which could increase the pleasure of the meeting. It was not the first time that they had shown an interest in the progress of pharmacy, that being the first College of the kind to institute a system of pharmaceutical education. In that College were provided lectures and laboratories, giving an education which would fit pharmacists not only to pass examinations, but for the scientific work of their lives. On his own behalf he need hardly say that as Professor of Materia Medica he took a deep interest in the progress of pharmacy, and he trusted that the present meeting would be successful in every respect, and especially that it would advance the true interests of scientific pharmacy.

The PRESIDENT, on behalf of the Conference, thanked Mr. Woolley and Professor Leech for the welcome they had given. The Conference met under very favourable auspices, in every respect, and he felt sure that the meetings would be promotive of the great purposes for which the Conference existed. He was certain that those who were visitors to Manchester would gain much pleasure and no small intellectual profit, and if they could leave behind them any pleasant recollections with their hosts, they would have largely accomplished the object of their visit.

RECEPTION OF DELEGATES.

Dr. THRESH (Hon. Gen. Sec.) then read the following list of delegates to the Conference:—

Pharmaceutical Society of Great Britain.—The President, Vice-President, and Messrs. S. R. Atkins, W. G.

Cross, R. Hampson, G. T. W. Newsholme, W. V. Radley, W. D. Savage, G. F. Schacht, C. Symes and G. S. Woolley.

Pharmaceutical Society of Great Britain (North British Branch).—Messrs. D. B. Dott, Daniel Frazer, Adam Gibson and Alexander Kinninmont.

Pharmaceutical Society of Ireland.—Mr. J. E. Brunker, M.A., Messrs. G. D. Beggs, F. J. Minchin, R. Simpson, J. Wells and Professor Tichborne.

Aberdeen and North of Scotland Society of Chemists and Druggists.—Messrs. G. E. Broomhead, W. Giles, J. Johnston and D. Ritchie.

Brighton Association of Pharmacy.—Messrs. Marshall Leigh and W. D. Savage.

Bristol Pharmaceutical Association.—Mr. G. F. Schacht.

Hawick Pharmaceutical Association.—Mr. T. Maben.

Hull Chemists' Association.—Messrs. C. B. Bell and W. H. Hammond.

Leeds Chemists' Association.—Messrs. F. W. Branson, P. Jefferson, R. Reynolds and G. Ward.

Leicester and Leicestershire Chemists' Association.—Messrs. S. F. Burford, E. H. Butler, J. W. Clark and J. G. F. Richardson.

Liverpool Chemists' Association.—Messrs. A. C. Abraham, J. F. Abraham, M. Conroy, A. H. Samuel and W. Wellings.

London Chemists' Assistants' Association.—Messrs. F. C. J. Bird, T. S. Dymond and J. E. Saul.

Manchester Pharmaceutical Association.—The members of the Council of the Manchester Pharmaceutical Association.

Midland Counties Chemists' Association.—Messrs. Perry, Wyles, Thompson, Alcock, Haydon, Pullen, Hinds and Jones.

North of England Pharmaceutical Association.—Messrs. N. H. Martin and J. Harrison.

Sheffield Pharmaceutical and Chemical Society.—Messrs. J. M. Furness, G. T. W. Newsholme and A. R. Fox.

Dr. THRESH also said that letters of apology for non-attendance, and expressing good wishes for the success of the Conference, had been received from Mr. Carteighe, President of the Pharmaceutical Society of Great Britain, Professor Bentley, Professor Attfield, and Messrs. Greenish, Barclay (Birmingham), J. B. Stephenson (Edinburgh), A. Strachan (Aberdeen) and F. Ransom (Hitchin).

The PRESIDENT said he had himself received similar letters from Professor Dunstan, Mr. Plowman and others.

ANNUAL REPORT.

Mr. W. A. H NAYLOR (Honorary Secretary) read the report of the Executive Committee and Financial Statement as follows:—

REPORT OF THE EXECUTIVE COMMITTEE.

Your Committee, in presenting its Annual Report of the business which it has transacted during the past year, feels that it has not altogether been an uneventful period in the history of the Conference. Following closely upon the retirement of the senior Honorary General Secretary, Mr. Sidney Plowman, F.R.C.S., at the Birmingham meeting, came the sudden resignation of the paid officer. At the meeting of the Executive in October last, it was announced that in consequence of failing health Mr. Princep had applied to be immediately relieved of his duties as Secretary, and that in consideration of the urgent demand of his case, his application had been immediately granted. The acceptance of his resignation was marked by an entry in the record of the proceedings of that meeting of the following minute:—"That the Honorary General Secretaries convey to Mr. Princep an expression of regret at the circumstances under which he was compelled to leave the service of the Conference, together with an appreciation of the satisfactory manner in which he had performed his duties as paid Secretary since February, 1881."

In selecting an officer in succession to Mr. Princep, a favourable opportunity was afforded your Committee of considering the most suitable conditions under which the appointment should be made. The choice lay between one of two courses, either to proceed on the lines on which the late Secretary was appointed, or return to the system in vogue prior to 1880. Of those who had made application for the vacancy, two had declared their willingness to accept election in accordance with the latter alternative, a fact which was largely instrumental in eliciting for it a renewed trial. It was accordingly decided to adopt this line of procedure, and Mr. W. H. Ince was appointed Assistant Secretary for one year at a salary of £40. It was further agreed, that a sum not exceeding £10 should be allowed him for expenses incurred in attending the Annual Meeting. Mr. Ince is now nearing the close of his year of office, but will not be able to accept re-election in consequence of his leaving England at an early date, to prosecute his studies at a continental university. He requests that his services may terminate after the present meeting.

Your Committee regret to have to announce the resignations of two Colonial Secretaries, that of Mr. H. Shillinglaw for Victoria, and of Mr. Ryder Horton for New South Wales. During the three years and a half which Mr. Shillinglaw has exercised his office, he has steadily and successfully laboured to promote the interests of the Conference. To Mr. Horton whose appointment is of recent date, is due the acknowledgment of having rendered hearty and useful service.

Early in the present year a series of circulars setting forth the objects of the Conference, and inviting to its membership, was posted to those unconnected with it, who had registered as chemists and druggists in Great Britain and Ireland since January, 1886.

A more numerous issue of a like kind has been circulated in India and the Colonies, the distribution having been effected severally by the Colonial Secretaries throughout the Colonies in which they respectively reside.

Although sufficient time has not elapsed to justify a numerical statement of the results of the home and foreign issue, there is already the prospect of an encouraging return. To those members who had promised to provide themselves with a copy of the General Index, and who up to the beginning of the year had neglected to do so, a circular note was addressed requesting them to fulfil their engagement as promptly as their convenience would allow. It is satisfactory to be able to announce that 188 of those addressed suitably responded to the appeal.

The report last year included a fitting reference to a new feature which characterized the proceedings of the Conference at Birmingham. The departure there taken was expressly intended to further the social objects of this association, and the results of the project were such as to leave no doubt of its success.

Your Committee in conference with the Local Committee arranged to repeat the experiment this year; accordingly last evening there was a reception by the President and officers of the Conference at the Grand Hotel.

Many members availed themselves of this opportunity of renewing friendships and of forming new ones. The whole spirit of last night's gathering encourages the inference that a Conversazione will henceforth find a permanent place in the proceedings of Conference.

It is with great pleasure your Committee is able to report that two applications for grants in aid of research have been made. A sum of £10 has been handed over to Mr. E. M. Holmes, for defraying the costs connected with the purchase and cultivation of authentic specimens of *Aconitum Napellus*, with a view subsequently to the extraction and chemical examination of its alkaloidal constituent.

This undertaking is a practical outcome of a suggestion offered by Mr. T. B. Groves, when discussing the

valuable paper on "Crystallized Aconitine," contributed by Mr. John Williams at the last General Meeting.

The sum of £5 has been placed at the disposal of Mr. W. Elborne, for a further research on Strophauthus and Strophanthin. The results of his investigation will be embodied in a report, to be presented to this meeting.

A year ago the Conference at its Annual Meeting appointed a Committee of ten of its members to prepare a formulary of unofficial remedies.

This Committee, through its Chairman, has handed in the draft of what it recommends for publication as the first edition of an Unofficial Formulary. The Executive Committee will now lay these results before the Conference.

Your Committee advises the reappointment of the Sub-Committee.

Mr. Siebold, F.I.C., F.C.S., was last December reappointed Editor of the 'Year-Book' for 1887, and the manuscript of the forthcoming volume, so far as it can be completed, is now on the table.

The number of papers which have been received for the present meeting is a little in advance of last year, and it is believed that the several contributions will provide ample scope for profitable discussion.

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1887.

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

July 1, 1886. *Dr.*	£	s.	d.	£	s.	d.
To Assets forward from last year—						
,, Balance in hand at Bank	219	7	0			
,, Balance in hand of Secretary	3	9	10			
,, Messrs. J. and A. Churchill's Account	114	10	6			
June 30, 1887.				337	7	4
To Sale of Year-Book by Publishers	17	3	4			
,, Sale of Year-Book by Secretary	0	7	6			
				18	0	10
,, Advertisements	124	1	0			
				124	1	0
,, Members' Subscriptions	611	13	9			
,, Surplus Cash left by late Secretary	0	4	1			
				611	17	10
,, Index to Year-Book, sale by Secretary	78	7	6			
,, Index to Year-Book, sale by Publishers	1	10	4			
				79	17	10
,, Outstanding Liabilities, W. I. Richardson's Account unpaid	11	5	6			
,, McCorquodale and Co.	16	8	6			
				27	14	0
				£1198	18	10

June 30, 1887. *Cr.*	£	s.	d.	£	s.	d.
By Expenses connected with Year-Book:—						
Printing, Binding, Publishing	384	13	11			
Postages and Distribution	42	10	0			
Advertising and Publishers' charges	34	7	3			
Foreign Journals	5	15	6			
Editor's Salary	150	0	0			
				617	6	8
,, Expenses connected with Index to Year-Book:—						
Postages and Distributing	1	10	0			
Preparing, etc.	53	3	0			
				54	13	0
,, Salary of Secretary				65	2	3
,, Blue Lists:—						
Printing	5	15	0			
Postages	9	6	4			
				15	1	4
,, Printing and Stationery				39	8	6
,, Postages				46	12	11
,, Formulary Committee				10	0	0
,, Expenses of Birmingham Meeting:—						
Mr. Princep	5	0	0			
Mr. Plowman	3	15	0			
Printing	9	13	6			
				18	8	6
,, Petty Cash				10	7	10
,, Grant to Mr. Elborne, Manchester				5	0	0
,, Bank Charges				0	1	0
,, Outstanding Liabilities on last year—Messrs. Butler and Tanner's account paid				137	2	0
,, Outstanding Assets—Messrs. J. and A. Churchill's Account, since paid				108	17	5
,, Balance at Bank	63	14	8			
,, Balance with Secretary—						
Petty Cash	3	2	0			
Postage	4	0	9			
				70	17	5
				£1198	18	10

THE BELL AND HILLS FUND.

July 1, 1886. *Dr.*	£	s.	d.
To Balance (forward from last year)	22	4	5
July 6, 1886.			
To Dividend on Consols, £350	5	1	6
Jan. 6, 1887. ,, ,, ,,	5	2	0
	£32	7	11

Oct. 26, 1886. *Cr.*	£	s.	d.	£	s.	d.
By Books for Birmingham				10	13	7
June 30, 1887.						
By Balance at Bank				16	12	4
,, Dividend accrued, but not received till July 20				5	2	0
				£32	7	11
July 1, 1887, To Balance	16	2	4			
	5	2	0			
	£21	14	4			

Examined and found correct, securities viewed. { C. J. ARBLASTER, Birmingham. A. WILKINSON, Manchester.

Mr. WILKINSON, Auditor, having testified to the correctness of the accounts, which he had examined, and the securities,

The PRESIDENT moved the adoption of the report and accounts. He remarked that like all records of human labour the report contained mingled experiences of sunshine and shadow; that there were shades in the form of resignations in the list of active workers could not be denied, but the impression produced on his mind was, that on the whole the Conference was in a thoroughly sound, healthy and flourishing condition. He believed he was only expressing the general opinion of the members, ladies as well as gentlemen, in saying that the idea of a preliminary conversazione, inaugurated last year at Birmingham, had proved a decided success. One of the purposes of the Conference was the promotion of social intercourse, and the advantage of meeting together before the business meetings commenced, and renewing old friendships and making new ones, could hardly be overestimated. With regard to the Unofficial Formulary

he would only say that the result of the Committee's work up to the present time had been printed, and he commended it to the careful examination of the members.

Mr. KEMP seconded the motion, which was at once carried unanimously.

The German Apotheker-Verein.

The PRESIDENT said it had been suggested that a telegram of congratulation should be sent to the German Apotheker-Verein, which was then sitting at Munich, and asked if it were the will of the meeting this should be done.

The suggestion was unanimously agreed to.

The PRESIDENT then delivered the following address:—

THE PRESIDENT'S ADDRESS.

The honour you have conferred on me in electing me as your President is one that I most highly appreciate, although it entails responsibilities I shrink from trying to discharge.

At any time I should have felt my inability worthily to introduce and conduct your deliberations, but in this year, so memorable in the history of our country, and in the city of Manchester, I am most deeply sensible of the difficulty of my position.

Enough, and perhaps more than enough has already been said respecting the Queen's Jubilee, and yet it would ill become me to omit all reference to it. Interested as we all are in the progress of science and in the development of the industries of our country we cannot but be thankful that during fifty years stability has attached to the throne, and life and health have been continued to the monarch of these realms.

Other and neighbouring lands have been agitated by revolutions, and have tried all possible varieties of government, but Great Britain has remained devoted to the House of Brunswick, and the recent celebrations have in a most remarkable manner brought to light the real depth of this devotion.

There is another topic on which I feel bound to say a few words as in some measure preparatory to the remarks that follow. We are assembled in the city of Manchester, a city whose history is strikingly illustrative of the progress of our country during the last fifty years.

As the railways converging hither carry us through the dense forest of chimneys; as on our way through the streets we gaze on the long rows of warehouses, and at length stand before the majestic town hall, it is difficult for us who are comparative strangers to the place to imagine what Manchester must have been half a century since.

The mail coach to London, first started in 1787, leaving Manchester at 4 a.m., and professing to reach London "early the next evening," had indeed been superseded by the railway, but who could have supposed that in the course of fifty years the power of locomotion could have been so increased, and the trade and industry of the nation have been so developed as to make it possible that in 1887 as many as fifteen or twenty express trains should be running up to the metropolis every day, and performing the journey in four and a quarter or four and a half hours?

This one fact speaks volumes.

Again, fifty years ago, the amount of traffic between Manchester and Liverpool was such as to tax to their utmost extent the carrying powers of river, road and rail; but what must the trade have grown to, and what must be the energy inherent in this great manufacturing centre, when it has become possible to float an enterprise which is to convert Manchester into one of the sea-ports of the kingdom?

And while the magnitude of the industries pursued in this district has become such as no one could have dreamt of in 1837, it is gratifying to observe that intellectual has kept pace with material progress. Educational and scientific institutions have been extended. Manchester has proved itself worthy of its Quaker citizen, John Dalton, who fifty years ago was Professor of Chemistry and Mathematics in the George Street Academy and President of your Literary and Philosophical Society, but whom all the world now remembers as the discoverer of the Atomic Theory.

Owens College has developed a taste for learning, and has led to the creation of the Victoria University, whose graduates will doubtless as time advances do their part towards extending the fame of Manchester as one of the great centres of thought in the United Kingdom.

And as the patroness of Art, this city has taken a position not surpassed by another city in the kingdom, except the Metropolis itself.

Music and painting have abundant admirers here, while the Art Exhibitions of 1857 and 1887 show that admiration of all that is beautiful in design and execution is not a mere passing fashion among men whose marvellous success in business has made them ambitious of surrounding themselves with the works once found only in the mansions of the aristocracy; but that there is a desire to promote the advancement of high art, and to give to all classes of the community an opportunity of enjoying its pleasures.

In one word the history of Manchester during the past fifty years forces upon us the lesson, that in all departments of life there must be incessant striving after progress.

Education must be pursued with even greater energy. Especially is this the case with regard to the science of chemistry and its allies—the sciences in which, as pharmacists, we are specially interested. Pressed as we are in our purely business relations by the severe competition of the age, it behoves us to develop, as far as possible, the purely scientific portion of our work.

I invite your attention to a brief review of the Victorian Era as it more especially affects ourselves as pharmacists.

Within this half century chemistry has made vast progress. The foundation of its success had been well and truly laid in the latter half of the eighteenth century and the beginning of the present century by a band of distinguished experimentalists scattered over Europe. Scheele, Lavoisier, Berzelius, Berthollet, Priestley, Davy, etc., were succeeded in our time by such eminent specialists as Faraday, Tyndall, Stokes, Hofmann, Perkin, Roscoe and Crookes, etc.

In 1775 Bergmann, of Upsala, carefully examined the law of simple elective affinity. In 1803 Berthollet carried the inquiry still further.

In 1766 Cavendish discovered hydrogen.

In 1774 Priestley discovered oxygen.

In 1819 Oersted discovered the law of electro-magnetism.

In 1822 Seebeck, of Berlin, discovered thermo-electricity. Nobili, in 1826, observed that electric currents were produced by animal tissues. With these and similar tools in the workshop of research in physical science, Faraday proceeded to accomplish his own grand work.

In 1802 Wollaston noticed the dark bands in the solar spectrum. In 1815 Fraunhofer produced a map of six hundred of them.

Then follow Herschell, Miller, Wheatstone and others, until Swan detects by spectrum analysis $\frac{1}{2500000}$ of a grain of sodium.

And five new bodies are admitted to the sacred college of the elements, amongst which our distinguished President of the Chemical Society contributes thallium.

In 1760 Black lectures on a new discovery—latent heat. Seguin, in 1839, and Mayer, in 1842, perfect their researches in the same direction.

From 1822 to 1845 Faraday is employed in his researches on the relation of magnetism to light.

These illustrations are taken from the realm of *physics*. But the truth equally applies to *physic*; a lengthened period of preparation has enabled the latter half of this century to reap magnificent results. And if I may be permitted still further to moralize as we pursue our way, I would remark how prone we are, dazzled with a brilliant victory, to forget the patient and laborious toil often extending over long long years that preceded it.

The change of the old order to the new is equally manifest, if we contemplate for a minute the science of botany.

Since 1837 botany has made such rapid strides as to have become almost revolutionized, except so far as relates to the simple description of plants and their parts and organs; although here much progress has been made.

Nearly all is new in reference to vegetable histology, the bases of which were laid by Schleiden and Mohl in their researches on "The Development and Structure of the Cell."

To improvements in the construction of the microscope and its use, are due in a great measure the important advance in our knowledge of the internal structure and development of plants and their parts.

In the physiology of plants very much is also new, but much still remains to be done, for which we must look in the future to the combined work of the vegetable physiologist, chemist and physicist.

In this age in connection with botanical study, it is necessary to make a passing reference to the great researches of Darwin as to the origin of species, fertilization of orchids, climbing and twining plants and tendrils, etc., etc.

Passing to systematic botany or the classification of plants, we notice that in 1837 the artificial system of Linnæus was in common use in this country; the only attempt to introduce a natural system having been made by Lindley about 1830, but it was not until 1845 that he propounded his views fully in his great work on the 'Vegetable Kingdom.' But at the present time the Linnæan system, which even Linnæus himself regarded as but an introduction to the natural system which he designated as the "præmium et ultimum in botanicis desideratum," has been entirely superseded by the natural systems founded more especially upon the arrangement of De Candolle, Lindley and Bentham and Hooker.

Our knowledge of flowerless plants in 1837 was entirely cryptogamic, but immense strides have since been made in all that relates to the structure of the cryptogamia, and the whole subject as regards these plants is now regarded with intense interest, owing to the great light it has thrown and is throwing on the cause of propagation and treatment of diseases as evinced especially by the formation of the new science of bacteriology and the antiseptic treatment of disease.

Let us turn to another topic, and one in which we have a vital interest.

In 1841 an association composed of the leading London and provincial pharmacists was formed, which resulted in the creation of "the Pharmaceutical Society of Great Britain," a Society which has done more to raise the position of the chemist and druggist of this country than has been achieved by any other corporate body for its constituents.

The condition of pharmacy in 1841 and succeeding years explains the motives and the conduct of our founders. Our very existence was threatened; expansion and growth on the better side—the scientific and semi-professional—was attacked from a groundless suspicion as to our secret ambitions. Hence self-defence was the cry of the hour.

History, in one respect at least, is ever repeating herself—the hour reveals the man.

Pharmacy may well be proud of the men who then came to the front and championed her cause.

A veritable galaxy of high principled, self-sacrificing men they were, and as fixed stars they are destined to abide in the pharmaceutical heavens.

Provincial chemists should never forget how much they owe to those men. The story has been well told, but I feel deeply, and at times sorrowfully, that it has not received the recognition it deserves. It may be we are yet too near the actors and the stage, accurately to assess the value of their work, but I am strongly convinced in my own judgment that as time flies the founders of our Society will stand forth prominently revealed not simply as the benefactors of their own order, but of society.

I am none the less conscious of the fact that to-day, struggling as we are with a competition as fierce as it is unprecedented, we can scarcely expect a fair and dispassionate appreciation of the philosophy of forty-six years since.

Disinterestedness was the prominent characteristic of those metropolitan pharmacists who headed the new movement, though self-preservation was the all-powerful instinct on which they played.

The Bayard of pharmacy "le bon chevalier, sans peur et sans reproche" was Jacob Bell, a man to whom we might apply the Laureate's words:—

> "He seemed the thing he was, and join'd
> Each office of the social hour
> To noble manners, as the flower
> And native growth of noble mind."

Jacob Bell was a man of whom we may be proud. Naturally diffident and retiring, circumstances forced on him a prominence and a responsibility he neither sought nor coveted. Endowed mentally and socially with every

qualification which to most men would have induced a let-alone policy, he threw himself with impassioned ardour into the cause, first of defence and then of progress.

I remember, as a lad, meeting him about this time, and I gratefully cherish the recollection of the impression he produced on my mind, as to the purity and nobility of his aims.

Jacob Bell united in himself to an unwonted degree, the faculties, rarely combined, of breadth of view and attention to detail. Do we adequately appreciate the humbler of these virtues?

Canova once excited the surprise of an onlooker that he was so careful as to the delicate touches in the less prominent parts of a statue.

"In the elder days of art
Builders wrought with greatest care,
Each minute and unseen part,
For the Gods see everywhere."

Jacob Bell possessed a mind stored with rich and varied culture and a conscience sensitive to the slightest touch.

His position was unique for usefulness in the direction to which he specially applied himself; wealthy and hence not suspected of a money-making ambition; occupying a position equally exceptional in his business relations with the medical profession; the intimate friend, and alternately the host and the guest of the recognized leaders in science and art, he stepped out from the ease and affluence in which he was placed, down into the arena of hard and oft of factious fight in the interests not of the privileged few but of the entire body of chemists and druggists in Great Britain.

Bell was loyally supported and seconded by such eminent men as Allen, Payne, Savory, Morson, Dinneford and others.

Indeed my time and your patience preclude the briefest possible reference either to their worth or their work.

But there are two eminent pharmacists happily still with us, to whom pharmacy and this Conference are deeply indebted, and whose names I venture to mention, Messrs. Thomas Hyde Hills and George Webb Sandford.

The Pharmaceutical Society found "a local name and habitation" at 17, Bloomsbury Square—the fountain-head of a river destined to widen and deepen as time rolls on. Growth follows on life: the movement was instinct with vital energy and development was correspondingly rapid. A Library and Museum were provided: a small laboratory was furnished: lectures were instituted, and fortunate in the highest degree was the Society in securing the services of such men as Thomson, Ure, Pereira, Fownes and Redwood.

The heart beating vigorously, the result is active circulation throughout the extremities of the body. At that time pharmaceutical literature was conspicuous for its absence: we had no journal or newspaper in which our policy could be expounded, hence the necessity of holding meetings in the principal towns of the kingdom to explain the movement and secure adherents. A large measure of success crowned the effort: chemists at length began to perceive and appreciate the necessity of combination.

The Society secured its Charter of Incorporation in 1843—the most important recognition the State could give, and secured at the cost of much forethought, labour and anxiety.

That document defines the objects of the newly incorporated body as *education, protection of interests* and *relief of distress.*

I have always thought that our founders were right—as to these objects, and, likewise, as to the order in which they placed them.

It may not be uninstructive to inquire some forty years afterwards, to what extent have these objects been realized?

Within the term of nearly half a century not only have nearly all the founders passed away, but so also have the major part of the rank and file then in business.

The Act of 1868 rendered examination a necessary condition of registration; for nearly twenty years the relative proportions of examined to unexamined men have been changing, and now are scattered all over the kingdom pharmacists with the hall mark of the Society, whose competency I have no right to question.

I have no wish to utter any sentimental nonsense about the "good old times," for I do not believe that they were better than the present. On the other hand, we need not be ashamed of those days. As apprentices we worked harder and longer than our youth do now; no doubt because we were obliged; and, it must be admitted, much of the work might have been done by the porter. There were as many incompetent and idle apprentices then as now: none the less, I fear that the conditions of apprenticeship in changing have not improved. The term of apprenticeship was longer, and the relations between pupil and principal closer, in so far as moral and intellectual influence is concerned. It is true there were no examinations to reveal our ignorance: few books to read and no lectures to attend, so that in theory we were thinly clad; but in practical manipulation we were thoroughly equipped. The preparations of the Pharmacopœia were respectably turned out, so far as the appliances of a fairly well-appointed country laboratory would admit of. They were not always elegant by the light of modern standards, but they were known to be *genuine*, and they were *home-made*!! In short, the principal of a establishment having covenanted to teach his pupil as much of his craft as he knew, honourably fulfilled his part of the covenant.

Such is the personal testimony I bear to a contract I duly signed, sealed and delivered—an Indenture I am startled to find dating from 1843—my own humble charter of incorporation in pharmacy dating from the same year as the Charter of our Society.

Under the old order of things there were chemists in every part of the country of superior culture and possessing a fair acquaintance with scientific research, but they were only a small minority.

Much *then* remained to be done, and, I regret to add, much *remains* to be done.

The question of education continues to be *the* question of the hour, and like other pressing questions of the day brooks no delay. It has been before the country for a long time; it has been the theme of more than one presidential address to the Conference; it has been discussed from every point of view by some of our ablest thinkers, and at length has secured a fairly strong consensus of

opinion in favour of a *compulsory training*. In that verdict I heartily concur.

I shall not pursue the question as to the methods by which that training shall be secured, it has been carefully treated by my predecessor in the chair and by Mr. Barclay, of Birmingham. I have confidence in the law of supply and demand; at the present moment the former is in excess of the latter.

The voluntary principle, valuable in many respects, has in this matter proved inadequate. The wreck of fondly-cherished, but illusive, hopes in our examination rooms is a melancholy fact, but the victims deserve more pity than anger. I speak from an intimate knowledge of the Boards of Examiners when I say that they do their duty fearlessly and fairly. But no examining body can be popular unless it pass all candidates, or we get within measurable distance of the millennium.

In one word, the mischief lies not in examination, but in the absence of training.

I have for a long time felt that it is desirable to raise the standard of the Preliminary examination.

The middle class education of England is in a most unsatisfactory state; the education imparted in our national schools has so improved since the passing of the Elementary Education Act that the errand boy is often more accurately grounded in knowledge than the apprentice; hence the desirability of making the initial test more stringent, and a correcter index of subsequent experience.

I do most emphatically protest against the injustice of allowing youths to enter a calling, the conditions of which have never been explained to them.

There is a tendency amongst a certain section of our *confrères* to speak of the times through which we are passing as merely a temporary crisis, the immediate phase of which will shortly disappear; hence the spirit of opportunism so prevalent.

The sooner the error is recognized and rectified, the better.

We *may* see again in Great Britain the days of commercial, industrial and agricultural prosperity we so long enjoyed, but we shall never return to the easy-going times of the past. We have entered on a new, if not a better order of things; the competition of the age must be reckoned with as a permanent factor; let us hope that the survival of the fittest may be the result.

The future condition of Pharmacy in this country in all probability will be developed on the scientific and semi-professional side. Pharmacists are trained to the manipulation of a large number of minute transactions involving much care and no small anxiety, but each one financially of small moment. Such operations have no tendency to develop the business man in the ordinary acceptation of the term. The conditions of the average pharmacy are opposed to the habit of broad generalization, so essential to success in other callings.

I am not despondent as to the future, but I feel that our hope lies in cultivating the scientific rather than the merely trading side of pharmacy, for in this direction from the nature of things competition will be less acute, and remuneration for service rendered on a higher scale.

Pharmacy has not wanted men who as true seers have perceived the nature of the coming struggle, and indicated the fashion in which it should be met. Such men were our founders, and such men are around me to-day. I honour a policy as beneficent as it is just.

The times of insular ignorance and independence are ending. Each decade of years is breaking down separating walls and erecting the international, in short the universal.

Continental nations are fast becoming our rivals. France, Germany, Austria, Russia, Scandinavia and even Spain demand a prolonged and thorough curriculum before an arts degree can be obtained.

I am aware that I am within range of hostile fire; I shall be reminded that the countries I have mentioned protect the pharmacist when qualified. I admit both the force and the fairness of the retort.

We have just ground of complaint; but this is neither the time nor the place for discussing our grievances. I merely remark that we shall not lessen them by maintaining the present standard of attainments.

At a recent interview with the Chancellor of the Exchequer, on the question of endowing or subsidizing the resources of our new universities, Sir Lyon Playfair uttered the following weighty words:—

"The experience of commercial nations throughout the world was, that the competition of industries was a competition of intellect."

We found ourselves on that statement, and urge that pharmacy will be no privileged exception to the law.

I do not ask for more stringency in the qualifying examination, but for more *solid* and *abiding* attainments; it would be an intellectual miracle, if the work of years crowded into a few months could be made a life-long possession.

Beyond and above the qualifying examination, we must offer inducement to capable and aspiring students to *pursue* their studies. An honours degree—a Fellowship in Pharmacy—would be a suitable distinction.

Such men we have amongst us; indeed, what would become of the Conference without them?

I am not unsympathetic with the struggles of many excellent high-principled men who are perplexed as to the future, but the Conference discreetly declines to discuss the politics of pharmacy, a rock on which speedy shipwreck would ensue.

There is a Society whose function it is to guard their privileges, and if we have been unsuccessful in that direction, it has not been from the want of will but of power.

It must be frankly admitted that pharmaceutical legislation is not the brightest chapter in our history. It is the old old story of internal dissension and external hostility; reluctant to combine save under the pressure of impending danger, relaxing even that partial attempt so soon as the peril was passed, we have never yet succeeded in bringing to bear at one time on public opinion and on the Legislature the weight of the collective opinion of 14,000 associated men.

I long for the unity of pharmacists with an intensity I cannot express, and I am prepared to make any personal sacrifices to achieve this end. When the central body representing pharmacy in Great Britain speaks authoritatively, not simply for its members but for the entire corporation of registered men, then will the impact of that influence be felt irresistibly in Parliament.

Whilst referring to that assembly I venture to express the hope that ere long pharmacy may be directly repre-

sented there ; special interests involving an acquaintance with many technical details require a trained specialist in the House to correct its judgment and assist in its special legislation. Manchester has placed science under an obligation in this respect.

The ancient fires of hostility I am thankful to believe have largely died out, but too frequently to be followed by a supineness equally paralysing.

I admit it to be a fairly debateable question whether our appeals to the superior courts have proved of any service to us ; the judgments of those courts seeming to us most illogical and inequitable.

We are tempted to exclaim with Goldsmith—

"How small of all that human hearts endure
That part which laws or kings can cause or cure."

Twenty-four years ago in the busy thriving town of Newcastle-on-Tyne my valued friend, the late Henry Deane, presided over the first meeting of the British Pharmaceutical Conference.

We turn with unmingled satisfaction to the fact that we are "an organization established for the encouragement of pharmaceutical research, and the promotion of friendly intercourse and union amongst pharmacists."

Two forces at work in society are ever counteracting each other ; the isolated action of the individual and the associated effort of the many. The value of the latter influence has been most happily and successfully illustrated in the history of the Conference ; had it achieved nothing better it would have justified its existence. Hospitality has been so charming and profuse as to need a little wholesome checking ; life-long friendships have been formed, and slowly a much-needed *esprit de corps* has been fostered.

But we exist chiefly and pre-eminently for the prosecution of original scientific research.

It is pertinent to inquire, how much of this work can we show after an existence of nearly a quarter of a century.

A review of the facts prohibits boasting, but may prove an abundant incentive to greater exertion. If the work accomplished be regarded in the light of the well nigh limitless field of inquiry, it dwindles almost to a vanishing point. That, however, is true of all research. The vastness of area necessitates division of labour, but before glancing at the special allotment in this field we are pledged to cultivate, it may be useful once again to ask what research means.

The attempt to compress into a sentence an answer to the question may only prove its partial truth. But may we not say *original scientific research* in its broad significance means *the investigation and revelation of all the facts and phenomena of universal nature? Creation is the domain of science.* There lies before each research worker not merely the boundless field of matter and law, but, if I may be pardoned the solecism, a field that actually tantalizes him by disclosing fresh realms as he pushes his own discoveries. Man stands thus with his own brief life, still briefer when limited to the period in which his intellectual and physical powers by careful training are fitted for the enterprise, in face of this fascinating complex problem.

Enough to fire ambition and also teach humility.

It can only be by a division of labour and a strict limitation of it to special subjects we assist in the general result.

"One science only will one genius fit,
So vast is art, so narrow human wit."

Research as distinguished from invention, or the application of knowledge previously acquired, is surrounded with difficulties, hence the comparatively few who pursue it. Gifts of mind, knowledge of prior work, money and suitable appliances to work with, are all needed.

An industry bordering on enthusiasm, an indifference to vulgar unreflecting applause, the absence of lionizing and public dinners, the non-necessity of mill-horse round of teaching others, such are favourable conditions for unlocking the secret casket of nature's inner mysteries.

The spirit of the age is not helpful to such results. We admit that the tendency to analyse is busy enough, and in its crusade neither institutions nor beliefs, however sacred and time-honoured are spared ; but of that we do not complain, so long as inquiry is exhaustive and inference not too rapid, for only falsehood shuns the light.

The restlessness of the age is alien to research. The life-long, though often barren labours of the mediæval alchemist would be an absolute anachronism in our day. The desire to gather the harvest so soon after sowing is fatal to effort of the right sort. And yet, is it not strange that in an age that chafes under incertitude, the very accuracy and finality of real research does not exert a more fascinating power? Conscious, too, as the research worker well may be, that each conquest in nature he makes is the promoter of human welfare in some form or another.

Occasionally the world has been startled by a great discovery that has revolutionized the entire field of search. Bacon, with his philosophy of induction ; Newton and the law of gravitation ; Galileo and the telescope ; Torricelli and the barometer ; Lavoisier's researches in the gases ; Berthollet's discovery of the chemical law of elective affinities ; Dalton and atoms ; Faraday and magnetism ; Darwin and evolution ; Pasteur and germs. These and many others, too numerous to mention, have been the pointsmen on the line of research, diverting the train of inquiry into new territories.

Working with laws revealed and with tools fashioned by the hands of such world-famous scientists, the educated pharmacist pursues his own investigation in pharmaceutical chemistry, etc.

And what are the records of the year that closes to day?

We have not been surprised in the field of pure science by any great and startling discovery, but in pharmacology the year has not been barren. The principal facts to be mentioned are, an endeavour to supply remedial agents in a more presentable and agreeable form. To substitute for crude drugs their active principles. To eliminate from preparations of drugs, substances that are inert and which have been found to induce instability, or that would produce unsightliness, or that would be nauseous to the palate. To provide remedies of definite strength, or that at least would be more uniform in their composition. Primarily these improvements are due to an increase of scientific knowledge amongst those who practise pharmacy, and indirectly to the severity of commercial competition.

The relative position of England amongst the nations

in regard to chemical research is a matter in which probably many divergent opinions exist in this assembly. My own impression is that, in relation to pure science, her position is on an equality with the continental nations, and in advance of that of the United States.

The discoveries in this field are probably fewer than those of the Germans, but they are not less important or less brilliant. Of this fact, the *Journal of the Chemical Society*, and the 'Proceedings of the Royal Society,' afford ample proof.

England I believe has a smaller number of professors of chemistry, but the *character of their researches* will bear favourable comparison with those of any civilized nation.

I do not think so favourable a judgment can be passed upon chemistry in relation to the various industries (applied chemistry).

In this country, the industrial chemist has confined his study too nearly to the *results* of research, to the neglect of *methods* of research ; hence the employment of German chemists in a large number of English chemical works.

The need can only be met by supplying to English chemists the opportunity of a *systematic technical training*.

You are doubtless aware that continental nations provide these advantages, and an initial movement has been made in this country in the same direction.

The strictly pharmaceutical work in both English and foreign laboratories during the past year is of a most interesting nature. Allow me to note some of it.

Cocaine.—The increasing extent to which cocaine is employed as a local anæsthetic, and the absence of uniformity in the various makes as they appear in commerce, justify a passing reference to the alkaloid.

Although recent investigations have considerably enlarged our knowledge of the chemistry of this base, there still remain obscure points which require for their settlement further experimental study.

Prominent amongst these is an inquiry now proceeding into the nature of the amorphous substance or substances which are commonly associated with the crystalline alkaloid.

Meanwhile, in view of the comparative ease with which cocaine can be obtained in a finely crystallizable condition, it seems needless to resort to other than the crystalline base.

Conine.—To Ladenberg, to whom chemical science is so largely indebted for its present knowledge of some of the alkaloids, belongs the proud distinction of having effected the first complete synthesis of a natural alkaloid. The amount of work done by this distinguished chemist, ere success attended his efforts, is most remarkable.

Indian Hemp.—Another important drug which has been made repeatedly the subject of chemical inquiry, and which has yielded various results to different investigators, has been examined by Jahn. He reports that the base he has isolated from Indian hemp, he has identified as choline.

Lobelia Inflata.—The most recent attempts at effecting a separation of the proximate principles of the leaves and seeds of this plant have resulted in the isolation of a *solid* alkaloidal substance.

Not long ago Rosen announced that he had succeeded in extracting from this drug both a liquid and a solid base, identical with those he had previously obtained from *Lobelia Nicotianæ-folia.*

This statement of the existence of two alkaloids in lobelia seeds J. U. and C. G. Lloyd in their latest investigations have been unable to confirm. For their alkaloid they have retained the name *lobeline.* They describe it as being colourless, odourless and amorphous, forming non-crystallizable salts. Therapeutically it is among the most powerful emetics.

These results are of considerable interest, and lead to the inference that the supposed volatile alkaloid of previous investigators was a mixture of bases contaminated with oil.

Strophanthin.—During the year some further interesting facts have been disclosed relating to the chemistry of the cardiac principle first extracted from the seeds of the kombé arrow poison by Professor Frazer.

It is noteworthy that of those who have devoted themselves to the isolation and examination of the bitter substance resident in the fruit of *Strophanthus Hispidus*, Professor Frazer alone has obtained it in a crystalline or semi-crystalline condition.

The difference, according to this eminent physiologist, appears to be due to some variation in the seeds operated on. It is satisfactory to observe that the records of the published results of various workers agree in pronouncing strophanthin to be a conjugated compound, and the latest recorded series of experiments show that under the influence of the yeast ferment it readily splits up into glucose and a crystallizable substance which has been named strophanthidin.

Pepperette, a clever imitation and adulteration of pepper, has at length surrendered to the joint attacks of chemist and microscopist, leaving little doubt that ground olive stones have been sometimes supplied to the English market as a domestic condiment.

The new chlorate process is interesting to us in chemical industry as a striking illustration of the tendency profitably to utilize otherwise waste products.

The cheaper production of sodium by Castner's process will in all probability be attended by important results in chemical manufactures.

The synthesis of pilocarpine by Messrs. Hardy and Calmels deserves a passing notice—a fact of recent interest, but of permanent value.

Gentlemen, I close this imperfect and I fear tedious sketch of the Victorian Æra as it stands related to us as pharmacists, and especially as a Conference. I may be charged with being Utopian as to the position and aim of cultured pharmacy reflected by this association. I do not, however, anticipate such a verdict from its members, for as such you are interested in the progress of truth, and are seeking its advancement by its *discovery.*

I cherish the confident belief that the Manchester meeting of the British Pharmaceutical Conference will not merely promote generous sentiments, but specially that the papers which will be read and the discussions which follow, will inspire us with noble aims and fresh endeavours.

" Who are the great ?
Those who have boldly ventured to explore
Unsounded seas, and lands unknown before—
Soared on the wings of science, wide and far,
Measured the sun, and weighed each distant star,

Pierced the dark depths of ocean and of earth,
And brought uncounted wonders into birth;
Repelled the pestilence, restrained the storm,
And given new beauty to the human form;
Wakened the voice of reason, and unfurled
The page of truthful knowledge to the world:
They who have toiled and studied for mankind,
Aroused the slumbering virtues of the mind,
Taught us a thousand blessings to create—
These are the nobly great."

Mr. F. Baden Benger, as Local Secretary, said he had the privilege of moving a vote of thanks to the President for his address. Mr. Atkins was already well known to them all, not only in connection with the Conference, but also in connection with the Pharmaceutical Society; some present had been associated with him on the Council of that body, and he might remind them that on the last election Mr. Atkins came out at the head of the poll. Some members again had been associated with him on the Board of Examiners. Some might remember kindly congratulations from him on passing an examination or winning a prize, and possibly one or two might remember equally kind words of advice and recommendations to come up again when better prepared. To them all, however, the President was well known as a man of great experience, of very wide culture, and of polished eloquence, and those who had come with high anticipations as to the address they were going to hear would not go away disappointed. He had himself listened to it with very great pleasure, and expected to renew that pleasure on reading it when printed.

Dr. Symes (Liverpool) had much pleasure in seconding the motion. He did not feel competent to remark upon the long history of science through which the President had taken them, but he noticed that he remarked in one place that he felt some regret in seeing there was still so much to be done in the advancement of pharmaceutical science. Now it occurred to him that there was another side of that question, and that they might also feel a pleasure in knowing that there was so much to be done, and he thought there was evidence in the numbers present that there were those who were ready and willing to do it. Every increment of knowledge in building up the great superstructure which they were all looking forward to, and which would probably never be perfect though they all strove to make it so, would simply land them on a higher platform from which they would see that there was still more to be done. The President had thrown out some hints as to the direction in which their efforts should be made; he had referred to the advantages of microscopic study in association with pharmacy, and he (Mr. Symes) ventured to think that in the study of botany particularly vegetable histology had not played so important a part in the past as it would do in future. This had been recently recognized at the School of Pharmacy in Bloomsbury Square, and in the appointment of a new professor of botany this had been especially borne in mind. The President had also enlarged on the advantages of scientific research, particularly as applied to pharmacy, and it must have occurred to the minds of many that in the new building now being erected in Bloomsbury Square, there were a number of rooms on the plan labelled "Research Laboratory." It was to be hoped that in the future an amount of useful work would be done there which would benefit them all. They had been reminded in the address of the importance of remembering that after all they were practical pharmacists, and that the end and aim of all their scientific education was the better conduct of the art of pharmacy. This led him to think of what he had been advocating for some time, viz., the teaching of practical pharmacy at Bloomsbury Square. It was now hoped that in the not very far distant future there would be the means of teaching in a scientific manner the practical part of their calling, and thus enabling students to prepare for the actual duties of their every-day life.

Mr. Brady, F.R.S., Vice-President, then put the motion, which was carried by acclamation.

The President, in acknowledging the vote of thanks, said he was perfectly sincere in stating that he fully appreciated the importance of the occasion, and his own want of fitness for the task which devolved upon him, but he was much reassured by the acknowledgment which had been made. The value of any acknowledgment depended on the source from which it came; not merely on the sincerity but on the capacity to judge of those who awarded it; and he might say, in no terms of flattery, that he valued more highly than he could express the mark of approval which had just been passed. He felt in sitting down to prepare this address that he had been preceded by a number of eminent men, who had so carefully harvested the field that there were only a few stray corns left behind. His desire had been to gather up these, and present them in the form of a sheaf of gleanings, and he was very pleased to think that in this task he had not been altogether unsuccessful.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-SIXTH ANNUAL MEETING.

The fifty-sixth annual meeting of the above Association commenced on Wednesday, August 31, at Manchester, under the Presidency of Sir Henry E. Roscoe, M.P., D.C.L., LL.D., Ph.D., F.R.S., V.P.C.S.

The President's Address.

Manchester, distinguished as the birthplace of two of the greatest discoveries of modern science, heartily welcomes to-day, for the third time, the members and friends of the British Association for the Advancement of Science.

On the occasion of our first meeting in this city, in the year 1842, the President, Lord Francis Egerton, commenced his address with a touching allusion to the veteran of science, John Dalton, the great chemist, the discoverer of the laws of chemical combination, the framer of the atomic theory upon which the modern science of chemistry may truly be said to be based. Lord Francis Egerton said: "Manchester is still the residence of one whose name is uttered with respect wherever science is cultivated, who is here to-night to enjoy the honours due to a long career of persevering devotion to knowledge, and to receive from myself, if he will condescend to do so, the expression of my own deep personal regret that increase of years, which to him up to this hour has been but increase of wisdom, should have rendered him in respect of mere bodily strength unable to fill on this occasion an office which in his case would have received more honour than it could confer. I do regret that any cause should have prevented the present meeting in his native town from being associated with the name." And here I must ask you to allow me to exchange the name of Dalton in 1842 for that of Joule in 1887, and to add again in the words of the President of the former year that I would gladly have served as a doorkeeper in any house where Joule, the father of science in Manchester, was enjoying his just pre-eminence.

For it is indeed true that the mantle of John Dalton has fallen on the shoulders of one well worthy to wear it, one to whom science owes a debt of gratitude not less than that which it willingly pays to the memory of the originator of the atomic theory. James Prescott Joule it was who, in his determination of the mechanical equivalent of heat, about the very year of our first Manchester meeting, gave to the world of science the results of experiments which placed beyond reach of doubt or cavil the greatest and most far-reaching scientific prin-

ciple of modern times, namely, that of the conservation of energy. This, to use the words of Tyndall, is indeed a generalization of conspicuous grandeur fit to take rank with the principle of gravitation, more momentous, if that be possible, combining as it does the energies of the material universe into an organic whole, and enabling the eye of science to follow the flying shuttles of the universal power as it weaves what the Erdgeist in 'Faust' calls "the living garment of God."

It is well, therefore, for us to remember, in the midst of the turmoil of our active industrial and commercial life, that Manchester not only well represents the energy of England in these practical directions, but that it possesses even higher claims to our regard and respect as being the seat of discoveries of which the value not only to pure science is momentous, but which also lie at the foundation of all our material progress and all our industrial success. For without a knowledge of the laws of chemical combination all the marvellous results with which modern industrial chemistry has astonished the world could not have been achieved, whilst the knowledge of the quantitative relations existing between the several forms of energy, and the possibility of expressing their amount in terms of ordinary mechanics, are matters which now constitute the life-breath of every branch of applied science. For example, before Dalton's discovery every manufacturer of oil of vitriol—a substance now made each week in thousands of tons within a few miles of this spot—every manufacturer had his own notions of the quantity of sulphur which he ought to burn in order to make a certain weight of sulphuric acid, but he had no idea that only a given weight of sulphur can unite with a certain quantity of oxygen and of water to form the acid, and that an excess of any one of the component parts was not only useless but harmful. Thus, and in tens of thousands of other instances, Dalton replaced rule of thumb by scientific principle. In like manner the applications of Joule's determination of the mechanical equivalent of heat are even more general; the increase and measurement of the efficiency of our steam engines and the power of our dynamos are only two of the numerous examples which might be adduced of the practical value of Joule's work.

If the place calls up these thoughts, the time of our meeting also awakens memories of no less interest, in the recollection that we this year celebrate the Jubilee of her Most Gracious Majesty's accession to the throne. It is right that the members of the British Association for the Advancement of Science should do so with heart and voice, for although science requires and demands no royal patronage, we thereby express the feeling which must be uppermost in the hearts of all men of science, the feeling of thankfulness that we have lived in an age which has witnessed an advance in our knowledge of nature, and a consequent improvement in the physical, and let us trust also in the moral and intellectual, well being of the people hitherto unknown; an age with which the name of Victoria will ever be associated.

To give even a sketch of this progress, to trace even in the merest outline the salient points of the general history of science during the fifty momentous years of her Majesty's reign, is a task far beyond my limited powers. It must suffice for me to point out to you, to the best of my ability, some few of the steps of that progress as evidenced in the one branch of science with which I am most familiar, and with which I am more closely concerned, the science of chemistry.

In the year 1837 chemistry was a very different science from that existing at the present moment. Priestley, it is true, had discovered oxygen, Lavoisier had placed the phenomena of combustion on their true basis, Davy had decomposed the alkalies, Faraday had liquefied many of the gases, Dalton had enunciated the laws of chemical combination by weight, and Gay Lussac had pointed out the fact that a simple volumetric relation governs the combination of the gases. But we then possessed no knowledge of chemical dynamics, we were then altogether unable to explain the meaning of the heat given off in the act of chemical combination. The atomic theory was indeed accepted, but we were as ignorant of the mode of action of the atoms and as incapable of explaining their mutual relationship as were the ancient Greek philosophers. Fifty years ago, too, the connection existing between the laws of life, vegetable and animal, and the phenomena of inorganic chemistry, was ill understood. The idea that the functions of living beings are controlled by the same forces, chemical and physical, which regulate the changes occurriug in the inanimate world, was then one held by only a very few of the foremost thinkers of the time. Vital force was a term in everyone's mouth, an expression useful, as Goethe says, to disguise our ignorance, for

Wo die Begriffe fehlen,
Da tritt ein Wort zur rechten Zeit sich ein.

Indeed the pioneer of the chemistry of life, Liebig himself, cannot quite shake himself free from the bonds of orthodox opinion, and he who first placed the phenomena of life on a true basis cannot trust his chemical principles to conduct the affairs of the body, but makes an appeal to vital force to help him out of his difficulties; as when in the body politic an unruly mob requires the presence and action of physical force to restrain it and to bring its members under the saving influence of law and order, so too, according to Liebig's views, in the body corporeal a continual conflict between the chemical forces and the vital power occurs throughout life, in which the latter, when it prevails, insures health and a continuance of life, but of which defeat insures disease or death. The picture presented to the student of to-day is a very different one. We now believe that no such conflict is possible, but that life is governed by chemical and physical forces, even though we cannot in every case explain its phenomena in terms of these forces; that whether these tend to continue or to end existence depends upon their nature and amount, and that disease and death are as much a consequence of the operation of chemical and physical laws as are health and life.

Looking back again to our point of departure fifty years ago, let us for a moment glance at Dalton's labours, and compare his views and those of his contemporaries with the ideas which now prevail. In the first place it is well to remember that the keystone of his atomic theory lies not so much in the idea of the existence and the indivisible nature of the particles of matter—though this idea was so firmly implanted in his mind, that being questioned on one occasion on the subject, he said to his friend the late Mr. Ransome, "Thou knowst it must be so, for no man can split an atom"—as in the assumption that the weights of these particles are different. Thus, whilst each of the ultimate particles of oxygen has the same weight as every other particle of oxygen, and each atom of hydrogen, for example, has the same weight as every other particle of hydrogen, the oxygen atom is sixteen times heavier than that of hydrogen, and so on for the atoms of every chemical element, each having its own special weight. It was this discovery of Dalton, together with the further one that the elements combine in the proportions indicated by the relative weights of their atoms or in multiples of these proportions, which at once changed chemistry from a qualitative to a quantitative science, making the old invocation prophetic, "Thou has ordered all things in measure and number and weight."

The researches of chemists and physicists during the last fifty years have not only strengthened but broadened the foundations of the great Manchester philosopher's discoveries. It is true that his original numbers, obtained by crude and inaccurate methods, have been replaced by more exact figures, but his laws of combination and his atomic explanation of those laws stand as the great bulwarks of our science.

On the present occasion it is interesting to remember

that within a stone's-throw of this place is the small room belonging to our Literary and Philosophical Society which served Dalton as his laboratory. Here with the simplest of all possible apparatus—a few cups, penny ink bottles, rough balances, and self-made thermometers and barometers—Dalton accomplished his great results. Here he patiently worked, marshalling facts to support his great theory, for as an explanation of his laborious experimental investigations the wise old man says: "Having been in my progress so often misled, by taking for granted the results of others, I have determined to write as little as possible but what I can attest by my own experience." Nor ought we when here assembled to forget that the last three of Dalton's experimental essays—one of which, on a new method of measuring water of crystallization, contained more than the germ of a great discovery—were communicated to our Chemical Section in 1842, and that this was the last memorable act of his scientific life. In this last of his contributions to science, as in his first, his method of procedure was that which has been marked out as the most fruitful by almost all the great searchers after nature's secrets, namely the assumption of a certain view as a working hypothesis, and the subsequent institution of experiment to bring this hypothesis to a test of reality upon which a legitimate theory is afterwards to be based. "Dalton," as Henry well says, "valued detailed facts mainly, if not solely, as the stepping-stones to comprehensive generalizations."

Next let us ask what light the research of the last fifty years has thrown on the subject of the Daltonian atoms: first, as regards their size; secondly, in respect to their indivisibility and mutual relationships; and thirdly, as regards their motions.

As regards the size and shape of the atoms Dalton offered no opinion, for he had no experimental grounds on which to form it, believing that they were inconceivably small and altogether beyond the grasp of our senses aided by the most powerful appliances of art. He was in the habit of representing his atoms and their combinations diagrammatically as round discs or spheres made of wood, by means of which he was fond of illustrating his theory. But such mechanical illustrations are not without their danger, for I well remember the answer given by a pupil to a question on the atomic theory: "Atoms are round balls of wood invented by Dr. Dalton." So determinedly indeed did he adhere to his mechanical method of representing the chemical atoms and their combinations that he could not be prevailed upon to adopt the system of chemical formulæ introduced by Berzelius and now universally employed. In a letter addressed to Graham in April, 1837, he writes: "Berzelius' symbols are horrifying. A young student in chemistry might as soon learn Hebrew as make himself acquainted with them." And again: "They appear to me equally to perplex the adepts in science, to discourage the learner, as well as to cloud the beauty and simplicity of the atomic theory."

But modern research has accomplished, as regards the size of the atom, at any rate to a certain extent, what Dalton regarded as impossible. Thus in 1865 Loschmidt, of Vienna, by a train of reasoning which I cannot now stop to explain, came to the conclusion that the diameter of an atom of oxygen or nitrogen was $\frac{1}{10000000}$ of a centimetre. With the highest known magnifying power we can distinguish the $\frac{1}{40000}$ part of a centimetre; if now we imagine a cubic box, each of whose sides has the above length, such a box when filled with air will contain from 60,000,000 to 100,000,000 of atoms of oxygen and nitrogen. A few years later William Thomson extended the methods of atomic measurement, and came to the conclusion that the distance between the centres of contiguous molecules is less than $\frac{1}{50000000}$ and greater than $\frac{1}{100000000}$ of a centimetre; or to put it in language more suited to the ordinary mind, Thomson asks us to imagine a drop of water magnified up to the size of the earth, and then tells us that the coarseness of the graining of such a mass would be something between a heap of small shot and a heap of cricket balls. Or again, to take Clifford's illustration, you know that our best microscopes magnify from 6000 to 8000 times; a microscope which would magnify that result as much again would show the molecular structure of water. Or again, to put it in another form, if we suppose that the minutest organism we can now see were provided with equally powerful microscopes these beings would be able to see the atoms.

Next, as to the indivisibility of the atom, involving also the question as to the relationships between the atomic weights and properties of the several elementary bodies.

Taking Dalton's aphorism, "Thou knowst no man can split an atom," as expressing the view of the enunciator of the atomic theory, let us see how far this idea is borne out by subsequent work. In the first place, Thomas Thomson, the first exponent of Dalton's generalization, was torn by conflicting beliefs until he found peace in the hypothesis of Prout, that the atomic weights of all the so-called elements are multiples of a common unit, which doctrine he sought to establish, as Thorpe remarks, by some of the very worst quantitative determinations to be found in chemical literature, though here I may add that they were not so incorrect as Dalton's original numbers.

Coming down to a somewhat later date, Graham, whose life was devoted to finding what the motion of an atom was, freed himself from the bondage of the Daltonian aphorism, and defined the atom not as a thing which cannot be divided, but as one which has not been divided. With him, as with Lucretius, as Angus Smith remarks, the original atom may be far down.

But speculative ideas respecting the constitution of matter have been the scientific relaxation of many minds from olden time to the present. In the mind of the early Greek the action of the atom as one substance taking various forms by unlimited combinations was sufficient to account for all the phenomena of the world. And Dalton himself, though upholding the indivisibility of his ultimate particles, says: "We do not know that any of the bodies denominated elementary are absolutely indecomposable." Again Boyle, treating of the origin of form and quality, says: "There is one universal matter common to all bodies—an extended divisible and impenetrable substance." Then Graham in another place expresses a similar thought when he writes: "It is conceivable that the various kinds of matter now recognized as different elementary substances may possess one and the same ultimate or atomic molecules existing in different conditions of movement. The essential unity of matter is an hypothesis in harmony with the equal action of gravity upon all bodies."

What experimental evidence is now before us bearing upon these interesting speculutions? In the first place, then, the space of fifty years has completely changed the face of the inquiry. Not only has the number of distinct well-established elementary bodies increased from fifty-three in 1837 to seventy in 1887 (not including the *twenty* or more new elements recently said to have been discovered by Krüss and Nilson in certain rare Scandinavian minerals), but the properties of these elements have been studied and are now known to us with a degree of precision then undreamt of. So that relationships existing between these bodies which fifty years ago were undiscernible are now clearly manifest, and it is to these relationships that I would for a moment ask your attention. I have already stated that Dalton measured the relative weights of the ultimate particles by assuming hydrogen as the unit, and that Prout believed that on this basis the atomic weights of all the other elements would be found to be multiples of the atomic weight of hydrogen, thus indicating that an intimate constitutional relation exists between hydrogen and all the other elements.

(*To be continued.*)

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Dyer, W. H. Vernon, Lawrence, S. Hardwick, Lindum, G. W. H.

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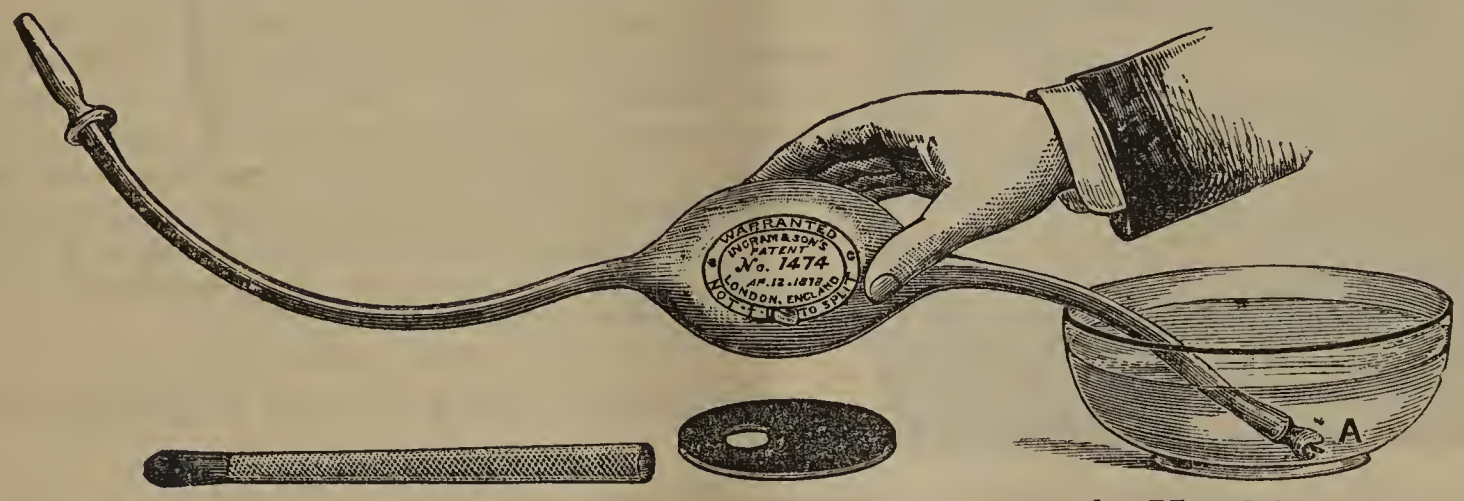


All Imitations may be detected by the Ribs on the surface, and are always liable to split.

A—Metal Pin Valve.

WARRANTED NOT TO SPLIT.

INGRAM'S IMPROVED PATENT SEAMLESS ENEMA is perfectly smooth on the surface, will not become hard or sticky, will not leak, and will not admit air while injecting or refilling. Specially prepared to resist the heat of tropical countries.

The great superiority of **INGRAM'S IMPROVED PATENT SEAMLESS ENEMA** over all others has given rise to VARIOUS IMITATIONS, and it has become imperative that the Patentees should, in order to PREVENT DECEPTION, explain the PROCESS OF MANUFACTURE OF THEIR ENEMA and the MODE OF MANUFACTURE OF IMITATIONS thereof, as they have UNDENIABLE PROOF that INFERIOR ENEMAS are positively BEING SOLD as their "ADVERTISED" PATENT SEAMLESS ENEMA.

The mode of manufacture of **INGRAM'S IMPROVED PATENT SEAMLESS ENEMA** is by repeated dipping in a solution of India Rubber until the required substance is attained. This process adds greatly to its STRENGTH and DURABILTY, and, at the same time, dispenses with ALL SEAMS, which, as is well known, are weak points in an Enema. This improved method (the result of long study and experience) enables the Patentees to produce a PERFECT ENEMA WITHOUT SEAMS, thus overcoming the great fault to be found in all other Enemas, viz.:—SPLITTING AND LEAKING, which has always been a source of trouble.

INGRAM'S IMPROVED PATENT SEAMLESS ENEMA is fitted with IMPROVED VALVES, which prevent the admission of air with the fluid, and CAN at any time BE REPAIRED if necessary.

CAUTION.

IMITATIONS OF INGRAM'S IMPROVED PATENT SEAMLESS ENEMA are made of several pieces of Sheet India Rubber, which are cemented together and shaped in a mould, THUS PRODUCING RIBS ON THE SURFACE, and ENEMAS SO MANUFACTURED ARE ALWAYS LIABLE TO SPLIT AND LEAK AT THE SEAMS, AND THUS TO BECOME QUITE USELESS.

INGRAM'S IMPROVED PATENT SEAMLESS ENEMA may be distinguished from ALL IMITATIONS by its ENTIRE FREEDOM FROM RIBS OF ANY DESCRIPTION on its surface, and by having an IMPROVED METAL PIN VALVE at the suction end, and it is acknowledged to be the only PERFECT ENEMA OBTAINABLE.

Patented in England, No. 1474, April 12th, 1878; in France, No. 126,909, October 11th, 1878; and in America, No. 212,939, March 4th, 1879.

To be obtained of all Surgical Instrument Makers, Druggists' Sundriesmen, Chemists and Druggists, in the three following qualities:—

No. 1a. Highly Polished, in Red, Green, Blue, Black, or White.

No. 1b. Unpolished, in Red, Green, Blue, Black, or White.

No. 2. Unpolished, in Drab only.

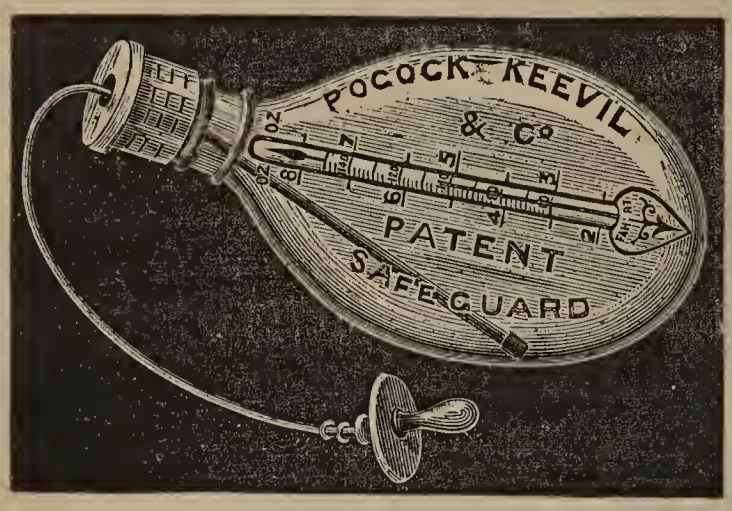
Favourably noticed in *British Medical Journal*, 13th December, 1879, and in *Lancet*, 3rd January, 1880, and in *British Medical Journal*, September 30th, 1882.

"THE BEST NATURAL APERIENT."

Persistent attempts are made by interested parties to deceive the public by offering Natural Mineral Aperient Waters with marks, names, and designations very similar to those which are used by the **APOLLINARIS COMPANY, LIMITED,** for the **NATURAL MINERAL APERIENT WATERS** imported by them.

Under these circumstances the **APOLLINARIS COMPANY, LIMITED,** feel compelled to caution the public that the **HUNGARIAN BITTER WATER** sold by the **COMPANY** always bears the name of the **APOLLINARIS COMPANY, LIMITED,** on the Label.

THE PATENT
THERMO SAFEGUARD FEEDING BOTTLE



HAS THE FOLLOWING SPECIALITIES :—

A Thermometer (which is guaranteed correct) is part of the construction of the bottle, and instantly registers the temperature of its contents.

Each bottle is gauged to show the quantity consumed. Can also be used without tubing, like the boat-shaped bottle.

This marvellously simple, yet scientific, invention is proving itself such an *immense boon* to *Mothers*, *Nurses*, and *Doctors* that it must soon become universal. Highly recommended by the leading Medical Authorities.

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FOR THE TREATMENT AND CURE OF ALL

Diseases of the Lungs, Windpipe, Nose and Throat,

Claims to be a Specific for all Congestive and Inflammatory conditions of the Respiratory Apparatus, and will be found efficacious in

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REGISTERED.

COUGHS & COLDS, ASTHMA, BRONCHITIS,

Inflammation and Congestion of the Lungs, Pneumonia, Pleurisy, Whooping Cough, Croup, Diphtheria, Pharyngitis, Laryngitis, Catarrh, Sore Throat, Quinsy, Enlarged Tonsils, Hoarseness, Loss of Voice, Colds in the Head, Ozœna, Hay Fever and all other Complaints of the Respiratory Organs.

PREPARED ONLY BY THE INVENTOR.

None Genuine except such as bears the Trade Mark and his Signature upon the Bottle, on the Label over the Cork, and on the Wrapper,

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The Discoverer of the Specific Cure for Consumption, and of the Medicinal Properties of the Hypophosphites.

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Spiritus Ætheris Nitrosi

Guaranteed to contain the proportion of Nitrous Ether directed by the British Pharmacopœia.

Æther Nitrosus and Sol. Ætheris Nitrosi

Respectively 8 and 4 times the strength of the Spirit.

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Made from Volcanic Ammonia.

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The Original Preparation of the Inventor,

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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

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A SPECIAL PREPARATION.

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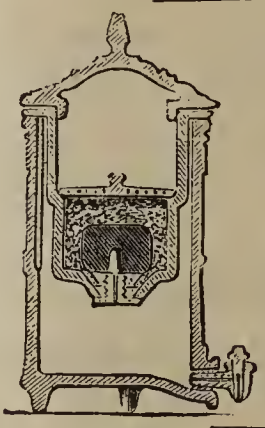

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For producing local Anæsthesia.
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In 2-oz., 4-oz., 8-oz., and 16-oz. Stoppered Bottles, 2s., 3s. 6d., 7s., and 12s.

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ETHYLATE of SODIUM
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For promoting the Healing of Wounds by the first intention.
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Containing pure Vegetable Ivory Charcoal. In boxes, 2s. 6d. each.

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Absolutely Pure.

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Invented and introduced to medicine by Mr. G. F. SCHACHT in 1855. Its distinct superiority is universally admitted. Dispensers are warned against imitations and substitutions, whose use endangers reputation.

Syr. Cinchonæ Alcoholic., Schacht.
Bark, minus the woody fibre. Dose ℥ss.

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An odourless and palatable fluid, guaranteed of invariable strength. One teaspoonful peptonises 1000 grs. of Albumen. Price 7s. per lb.

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A real aperient, mild and constant.

Infallible Essence of Rennet.
Entirely new, perfectly reliable, and does not cause vexatious failures, with consequent friction between buyer and seller. No SALT. No special taste, smell, or colour. Handsomely put up in large 1s. bottles.

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WINTER SEASON, 1887-8.

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KAY'S COMPOUND
Essence of Linseed, Aniseed, Senega, Squill, Tolu, &c.
(With Chlorodyne), 9½d., 13½d., 2/9, &c.

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EVANS' COATED PILLS

Pearl coated, readily soluble, prepared in our own laboratory, with best drugs only, such as are used in all Evans' Pharmaceutical preparations.

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Buy only SHIRLEY'S BRAND, in the manufacture of which only the very best MENTHOL is used, grown in the richest soils of Japan. This is of *great importance*, if MENTHOL is to keep up its popularity.

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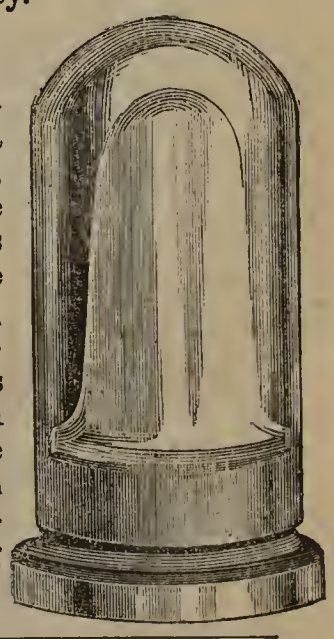

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Order one of SHIRLEY'S 25/- parcels and secure a Dummy Cone to put in your window. The Menthol can be kept in the cool, and the Dummy in the window, thus preventing evaporation caused by the cones being exposed to the rays of the sun.

Only saleable shapes sent.

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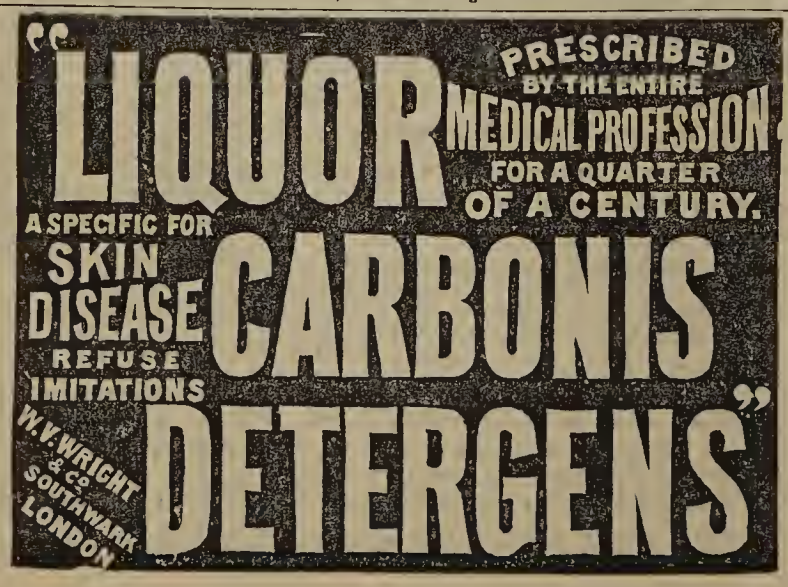

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Mr. T. A. ELLWOOD, M.P.S., &c.
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The next Session begins on Monday, 3rd October. For particulars apply to R. URQUHART, Secretary.

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The WINTER SESSION, 1887-88, will commence on Wednesday, the 5th October, when a Preliminary Examination will be Prospectus on application to the Secretary.

WESTMINSTER COLLEGE

The next Session will commence on Monday, September 5th.

FEES. { To the October Examination ... ... £6 6s.
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12 Months' Course (Minor and Major), £15 15s.
Preliminary, £1 1s. per month.

At the recent Examinations held in London, **37** Students of this College were successful in passing the Minor and Major. For names, see advertisement last week.

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Practical Analysis, 7 till 8; Class, 8 till 9.

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The London Hospital and Medical

COLLEGE, Mile End, E.

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FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All Resident and other Hospital Appointments are free, and the holders of all the Resident Appointments are provided with rooms and board entirely free of expense. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, one Accoucheurship, and one Receiving-room Officer; Dressers and Maternity Pupils also reside in the Hospital. Special Classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London, and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England, are held throughout the year. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, Metropolitan District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

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MEDICAL SCHOOL, Leicester Square. The WINTER SESSION will commence on Monday, October 3rd.

LECTURES.

Mechanical Dentistry—Dr. Walker, M.R.C.S., L.D.S., on Wednesdays, at 5 P.M., commencing on October 5th.

Metallurgy in its Application to Dental Purposes—Professor A. K. Huntington, F.C.S., on Tuesdays, at 12 A.M., commencing October 4th.

The SUMMER SESSION will commence in May, 1888.

Dental Surgery and Pathology—Mr. S. J. Hutchinson, M.R.C.S., L.D.S., on Tuesdays and Fridays, at 8 A.M.

Dental Anatomy and Physiology (Human and Comparative)—Mr Arthur Underwood, M.R.C.S., L.D.S., on Wednesdays and Saturdays, at 8 A.M.

General fee for Special Lectures required by the curriculum, £15 15s.

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	Dental Surgeons.	*Assist. Dental Surgeons.*
Monday, 9 A.M.	Mr. D. Hepburn	L. Matheson.
Tuesday ,,	Mr. R. Woodhouse	Mr. W. Hern.
Wednesday ,,	Mr. Gregson	Mr. E. Lloyd Williams.
Thursday ,,	Mr. Storer Bennett	Mr. G. Parkinson.
Friday ,,	Mr. Claude Rogers	Mr. L. Read.
Saturday ,,	Mr. F. Canton	Mr. Truman.

Anæsthesists—Mr. Braine, Mr. Bailey, Mr. Bird, Mr. Mills.

Assistant-Anæsthesists—Dr. D. W. Buxton, Dr. F. Hewitt.

Medical Tutor—Mr. W. B. Paterson.

Demonstrators—Mr. E. Latchmore; Mr. W. R. Ackland.

House-Surgeon—Mr. H. Williams.

Assistant House-Surgeons—Mr. T. F. Colyer; Mr. George Seymour.

The Medical Tutor holds Classes before each examination. The Demonstrator attends each day.

The House-Surgeon and Assistant House-Surgeons attend daily while the Hospital is open.

On every day during the Sessions the Surgeons of the day will, if practicable, give Demonstrations.

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Further particulars may be obtained on application to the Dean, at the Hospital, where he will attend in the afternoons from September 26th to October 1st inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.

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The Mason College, Birmingham.

SESSION 1887-88.

Faculties of Arts and Science.

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St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.

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Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

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R. W. REID, Vice-Dean.

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ACTIVE JUNIOR, in-doors, towards latter end of September, of good appearance and gentlemanly address. Must be good Dispenser and not afraid of work. Applicants must have been apprenticed in good business and be well recommended. Send full particulars, with carte, to SEASIDE, care of Hearon & Co., 5, Coleman St., E.C.

LOCUM TENENS, to take charge of light Retail for a week or longer. Must be competent, if not qualified. Address, by letter, to X. Y. Z., Norway House, Lothian Rd., Stockwell, S.W.

ASSISTANT, about 22, in light Retail and Dispensing business. A knowledge of telegraphy and postal work preferred (so as to be able to give occasional help), but not essential. Apply, by letter only, 22, Argyle St., Birkenhead.

A JUNIOR, who can assist at the Post Office. Apply, stating age, height, experience, salary required, and references, to CHEMIST, 50, Queen's Rd., Brighton.

IMMEDIATELY.—A thoroughly competent ASSISTANT, accustomed to good class Retail and Dispensing. State age, height, and enclose photo and reference. WILLIAM OLDERSHAW, Market Pl., Nottingham.

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AT once. Competent ASSISTANT. Indoors. About 22. For brisk Retail and Dispensing business. Must be a first-class Counterman. 8 kept. Apply with usual particulars, to J. H. LEWIS, 22, Great Portland St., W.

A JUNIOR, about 20 or 21, who has been accustomed to a good general country business, and who can be well recommended. Apply, giving full particulars, to DUNHILL & STILES, Pharmaceutical Chemists, Doncaster.

A COMPETENT ASSISTANT, not under 23. Accurate and neat Dispenser. Punctual and of good address. Hours of business, 8 to 9. State age, experience, references, and salary required, enclosing photo, to MEDICUS, Messrs. Cosway & Rutter, High Rd., Kilburn.

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MESSRS. SHIRLEY & SON require a Junior ASSISTANT. Minor qualification. Apply, if possible, personally. before 2 p.m., at 2, Westbourne Grove, Bayswater, W.

ASSISTANTS WANTED.

JUNIOR or IMPROVER about the last week in September, of steady habits and obliging manner, accustomed to Dispense and general Country trade. Apply, with references, &c., to Mr. D. JENKINS, Dispensing Chemist, Bridgend, Glamorgan.

A THOROUGHLY competent ASSISTANT, indoor, for a good class Retail and Dispensing business. One with London experience preferred. Must have passed Minor. Apply, stating age, height, salary required, and references, to HY. MONKHOUSE, All Saints, Derby.

AN ASSISTANT, not under 23 years of age, with experience in dispensing and of good address. Apply, personally if possible, to E. L. HICKEY, 199, King's Rd., Chelsea, S.W.

ASSISTANT. Minor qualification. Usual particulars. Apply, personally or by letter, to J. W. SMITH, Pharm. Chemist, Denbigh Rd., Westbourne Grove, W.

A COMPETENT ASSISTANT. Outdoor. With some knowledge of the wholesale. References must bear the strictest investigation. Apply, personally, to C. H. WARNER & Co., 55, Fore St., City.

MANAGER. Qualified preferred. Accustomed to good class Retail and Dispensing. If a Dentist, liberal commission would be given on all Dental work. Must have unexceptionable references. Apply, personally if possible, or by letter, with photo, stating age, height, salary, and references, to W. R. BAKER, Gipsy Hill, S.E.

JUNIOR ASSISTANT or TURNOVER. In-door. Apply, giving usual particulars, to GEORGE LINES, Pharmaceutical Chemist, Hertford.

ENERGETIC qualified ASSISTANT, about 25, accustomed to good class business, wanted by September 26th. State height, age, and salary required, with full particulars of experience, and enclose carte, to H., 90, Western Rd., Brighton.

IMMEDIATELY.—Qualified ASSISTANT (in-door), two kept. Must be thoroughly competent, pushing, neat, of good address, &c., for a high class suburban business. Good references indispensable. Send photo (to be returned) and full particulars to "PERMANENT," Barclay & Sons, Farringdon St., E.C.

OUT-door ASSISTANT immediately. Active and quick counterman. One speaking French would be preferred. Personal interview indispensable. SCHOUVER, Chemist, Princess St., Hanover Sq., London.

IMMEDIATELY.—ASSISTANT about 22 years of age, accustomed to good Dispensing business. Apply personally to JAMES GARNER, 119, Kensington High St., W.

AN ASSISTANT for first-class Retail and Dispensing business. One with London experience preferred. Send photo and full particulars to C., 75, King's Rd., Brighton.

A GOOD ASSISTANT for a light Retail and Dispensing business. Must be smart and obliging. Apply, giving full particulars, to WM. PEARSON, Pharmaceutical Chemist, Waterloo, near Liverpool.

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Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

OLD established Mixed Drug BUSINESS. Rent low. Main thoroughfare; manufacturing town. Rare bargain to bona fide purchaser. Terms, cash. Apply, JOHN LITCHFIELD, High St., Longton, Staffs.

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WEST OF ENGLAND.—Good market town. Returns £950, at full prices. Very little opposition. Handsomely fitted. Price £800. Moderate rental.

NORFOLK.—Old-established Retail and DISPENSING. Has done £1200, now neglected under manager. Price £500. Good house. Worth attention.

WEST OF ENGLAND.—High class DISPENSING. Returns £1400. Exceptionally good profits. Price £1400.

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Important to Chemists Fitting-up.

FOR SALE.—Handsome nearly new Dispensing Screen, with arched mirror centre and marble slab, 6-ft. long, £6 10s. 12-ft. range of French-polished pine Drawers, gold labelled and crystal knobs, £6 12s. 12-ft. range mahogany ditto, plate-glass labels, £9. Handsome mahogany Case, with tablet and desk, 55s. Four 4-gal. pear-shape Carboys, 10s. each. Four 6-gal., 14s. each. Pine Wall Case, 6-ft. long, £8. Twenty-four 2-lb. blue Jars, labelled, 1s. 6d. each. Twenty-four 3-lb. ditto, 2s. each. Twelve 4-lb. best pink ditto, labelled, 5s. each. Handsome bent front plate-glass Case, mirror back, 4-ft. long, £4. Fifteen dozen gold labelled Shop Rounds and Jars (new), £8 10s. Handsome mahogany Tooth Brush Case, with revolving front and mirror back, 60s. Illustrated lists and estimates free.—R. TOMLINSON & SONS, Midland Medical Fitting Warehouse, Bond Street, Constitution Hill, Birmingham.

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SURREY.—Good corner RETAIL in large town. Returns £430. Rent £30. Only £170. Bargain.

LIVERPOOL.—Retail and Dispensing BUSINESS. Returns £750. Neglected through illness. Price £550.

LONDON, S.E.—Retail and PRESCRIBING. Returns £1000. Net profit £450. Rent £42. Price £900.

N.—Neglected RETAIL. Returns £5 weekly. Only £60. Suitable for beginner.

12FT. wall-fixture, drawers, lockers, shelving, cup boards, and cornice, £8 10s.; 16ft. wall-fixture, mahogany, silvered plate-glass cupboards between shelving, glass labels and glass knobs to drawers; several others 9ft. wall-case; 10ft. ditto, ditto; 15ft. ditto, ditto, £18; a number of solid mahogany-top counters, framed and moulded, pine stained and polished fronts, from 5ft. to 12ft. long, at 6s. per foot run; also a number of black and gold fronted counters, with mahogany tops, at 6s. per foot run; 12ft. mahogany counter, £7 10s.; a plate-glass case-fronted counter, 12ft. long, £9 10s. E. NATALI, 207, Old Street, E.C.

All numbers refer to Maw's Illustrated List.—About 50ft. run mahogany wall-cases, 8ft. 6in. high, they are from 7ft. 6in. to 16ft. long, 20s. per foot run, equal to new; 11ft. mahogany-fronted counter, £7 10s.; ditto, 14ft. long ditto ditto, £9; 4ft. plate-glass case-fronted ditto, 70s.; 3ft. plate-glass counter-case, A 17, 55s.; 6ft. 9in. long ditto ditto, 20in. wide, £6 10s.; 3ft. bevel-fronted ditto, 35s.; 4ft. plate-glass ditto, as Maw's A 13, 50s.; 5ft. 6in. ditto ditto, 23in. wide, £5 10s.; 5ft. 6in. ditto ditto, as fig. A 3, 60s.—E. NATALI, 207, Old Street, London, E.C.

Plate-glass sponge-cases, fig. A 41, 65s.; ditto, ditto, as fig. A 43, 95s.; show-steps, A 37, 50s., as fig. A 39, 15s.; desk and glass case, A 31, 60s.; a ditto, ditto, 50s.; a number of dispensing-screens, from 5ft. to 8ft. long, glass case at each side, with silvered plate-glass in centre and marble slab in front, tablets on top of cases and shelves at back for dispensing bottles, very elaborate, from £6 10s.; a 3ft. ditto, as fig. A 54, 45s.; 3ft. 6in. ditto, 55s.; 4ft. ditto, ditto, 60s.; 4ft. 10in. ditto, 70s.; 5ft., as fig. A 55, 95s.; 6ft. ditto, £5 10s.; 6ft. 6in. ditto, £6; 7ft. ditto, £6 10s.; and a quantity of other screens very cheap; several pair specie jars, royal arms, equal to new, from 24in., price £4; carboy, 16 gallons, with mahogany stand; 3 4-gallon carboys, 10s. each; dome-covered pink ointment jars, gold labelled, any names, 3s. 9d. each; a lot of second-hand green, blue, 3 and 4 lb., 23 4-lb. blue ointment jars, 40s. the lot; ½-gall. displacement apparatus, fig. 53; black store bottles, with japanned caps, 1s. 3d. each.—E. NATALI, 207, Old Street, London, E.C.

A number of flat glass cases, various sizes, from 2ft. 6in. to 6ft. long, as fig. 2, to open at back, to be sold very cheap to make room; also a number as fig. 3—2ft. long, 30s.; 2ft. 6in. long, 32s.; 2ft. 8in. long, 35s.; 3ft. long, 40s.; 3ft. 6in. long, 45s.; as fig. A 8, 5ft. long, 95s.; 6ft. long, £5 10s.; as fig. A 15, 8ft. long, £7; 5ft. long, £4 10s.; as fig. A 16, 3ft. long, 55s.; 3ft. 6in. long, 60s.; 3ft. 9in. long, 65s.; 4ft. long, 70s.; as fig. A 17, 4ft. long, 75s.; as fig. A 18, 5ft. long, £5; 6ft. long, £5 10s.; tooth brush cases, as fig. A 9, 35s.; as fig. A 10, 50s.—E. NATALI, 207, Old Street, London, E.C.

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TO Let, a nice little shop and house suitable for a Chemist, where one is required. A good opportunity for a persevering man in a thickly populated neighbourhood; not a shop of the kind in the place. For particulars, apply to Mr. STREET, Linslade, Leighton Buzzard, Beds.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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WANTED.

WANTED.—Partnerships or first-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly. Cash ready.

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WE have now completed arrangements for the manufacture and supply of Concentrated Liquors for the extemporaneous production of

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FLETCHERS' CONCENTRATED LIQUORS FOR SYRUPS have long since earned for themselves an established reputation among Pharmacists in all parts of the world. They are in fact everywhere recognised as part of the necessary equipment of the dispensing counter. Most of the arguments which have been advanced in favor of preparing Syrups fresh and fresh, as required, from our Concentrated Liquors, apply with equal force to Decoctions, Infusions, and Tinctures.

Space will not admit of a recapitulation of these in detail, but we respectfully invite attention to the following

SEVEN GOOD REASONS

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5. **Because they occupy far less bulk than the old-fashioned "Concentrated Infusions," &c., and thus effect an important saving in carriage and storage, besides being more convenient to handle. Foreign buyers will attach special importance to these advantages.**
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Descriptive Pamphlet, with full detailed Price List, together with Trial Specimens, free on application to the Sole Manufacturers,

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during September. The Library and Museum in London will be closed the first fortnight in September.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *forty-six* annuitants, receiving £1575 per annum, and casual relief is also granted, amounting to upwards of £600 per annum, involving a total annual expenditure of about £2200.

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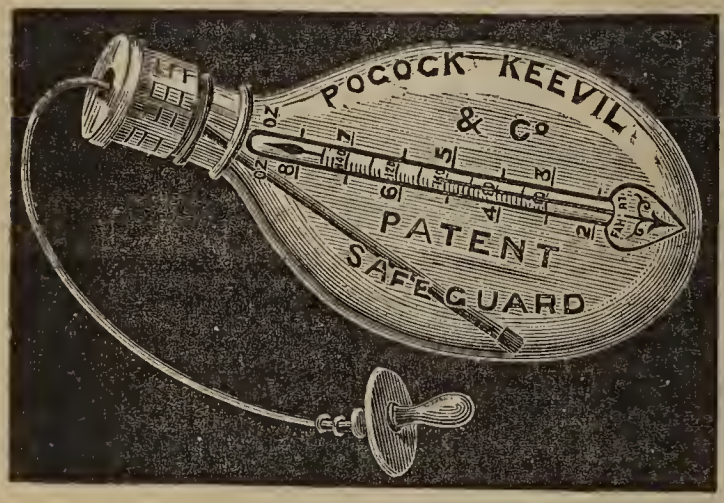

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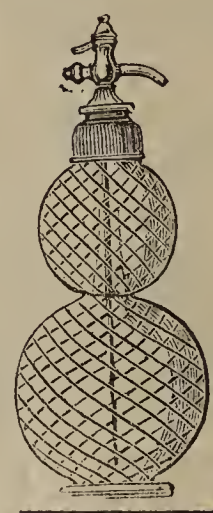

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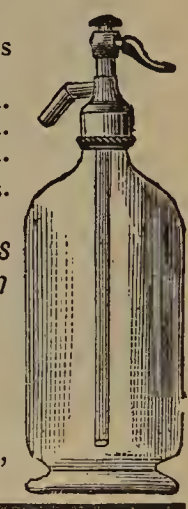

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Atropiæ Sulphas ..1-150th gr.	Morphiæ Sulphas ..1-3rd gr.
Atropiæ Sulphas ..1-100th gr.	Morphiæ Sulphas..1-half gr.
Atropiæ Sulphas ....1-60th gr.	Morphiæ Sulphas..1-12th gr. / Atropiæ Sulphas 1-250th gr.
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Hydrarg. Perchlor...1-60th gr.	Sclerotinic Acid.....1 gr.
Hydrarg. Perchlor...1-30th gr.	Strychniæ Sulphas1-150th gr.
Hyoscine..1-75th & 1-200th gr.	Strychniæ Sulphas1-100th gr.
Hyoscyamin .....1-80th gr.	Strychniæ Sulphas 1-60th gr.
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Put up in tubes, each containing 12 tabloids, at 1s. per tube.

The Hypodermic Pocket Cases of Burroughs, Wellcome & Co. contain space for syringe, small mortar and pestle, needles, wires, &c., and from six to twelve tubes of the tabloids.

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,, Mortar and pestle, 3d., or gratis with case.
Needle wires gratis with syringe.

Directions for use.—Fix a needle to the syringe and draw up a little water. Place the tabloid in the mortar and pulverise it with the pestle; then add a few drops of water, and triturate a few moments, when it will dissolve.

In absence of mortar and pestle, the tabloid can be crushed in a teaspoon with the end of syringe piston.

H. Augustus Wilson, M.D., Philadelphia, states, that for ophthalmic medication a Tabloid should be placed inside of the lower lid, it will be dissolved and absorbed in a couple of minutes without causing irritation or injury.

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Prices:—

A 12-tube Case as above, fitted with Shilling Tubes, and including Syringe, Needles, Wires, Mortar and Pestle or Spoon, complete, 21s.

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WARAS: ITS COMPOSITION AND RELATION TO KAMALA.

BY DAVID HOOPER, F.C.S.

Within the last four years waras or wars has been the subject of various notes in the *Pharmaceutical Journal*, in which its history, histology and botany have been discussed by several pharmacologists. The present paper is a supplement to what has already appeared, insomuch as it deals with some chemical and technical experiments with the authenticated drug of Southern India, and critically compares it with the kamala of the Pharmacopœias.

Source and Collection.—The plant which yields the red glands known as waras is *Flemingia Grahamiana* (W. and A.), a small leguminous undershrub growing on the northerly slopes of the Nilgiri plateau, as well as in other districts of India. The sample that came to my hands was from above the Gudalm ghaut, and collected by Mr. M. A. Lawson, Government Botanist in the Madras Presidency. Mr. Lawson has studied the species of *Flemingia* afforded by this part of India, and concludes that *F. rhodocarpa* of Baker is not specifically distinct from *F. Grahamiana*. The fruits ripen in November, towards the close of the north-east monsoon, when they are covered with the peculiar red glands. The drug is collected by cutting off the clusters of pods from the ends of the branches and laying them in the sun to dry for one or two days. They are placed upon boards or paper, as during the process of drying much of the powder falls, and would be lost unless such a precaution were taken. The pods are then pressed or rubbed together by hand over sieves. The powder is mixed with hairs, stones and pieces of stalk; it is readily removed from these impurities by finally passing it through a fine muslin or lawn sieve. Although the plant occurs pretty frequently in Southern India, very little seems to be known by the natives of its colouring or medicinal properties, and from inquiries made of Canarese traders north of the Nilgiris and Tamil people to the south, no information could be gleaned of its glands being a marketable article; but at a recent exhibition of the Agri-horticultural Society at Madras some of the powder was shown by a native dyer.

Terminology.—Waras, warus, wurrus, wurrhus, wors, wars, vars and huars are some of the names which have been applied at different times to the glands from Flemingia pods, and like most Eastern words, when translated into English characters, are variously written with an endeavour to represent the foreign accent. Daniel Hanbury, in 'Science Papers,' gives the Urdu or Hindustani name of the drug as used by the merchants at Aden, and renders the English equivalent as "waras." This word is distinctly bisyllabic in pronunciation; it signifies the "saffron"-like colour of the pigment, and, as Hanbury states, very probably originated with the Muhammadans of India. "Waras" has always been used by the authorities at Kew in their reports and correspondence, but Professor Flückiger and Dr. Dymock resent uniformity in this respect by continuing to employ the term "wars."

Characters and Tests.—Waras is a granular, mobile powder of a deep purplish-red colour, and without any marked odour or taste. Under the microscope it is in the form of cylindrical or subconical grains with oblong resin-cells arranged in stories in the interior. The powder ignites like lycopodium when thrown into the flame of a lamp. The specific gravity is 1·37. It is insoluble in cold water; when mixed together it at first floats on the surface, and if left in contact, it slowly becomes wetted, and sinks. If, however, it is rubbed up in a mortar before added to the water, or if it is boiled in it, the glands become broken and a bright yellow emulsion is formed; if this emulsion is allowed to stand the resinous matter will subside and leave a yellow, sweetish solution. The greater portion of waras is dissolved by ether and warm alcohol, the resulting solution being of a bright orange-red colour; when treated with caustic alkalies the solution is intensely red. It sinks in oil of turpentine, imparting a slight colour to it after a time. When rubbed up in a mortar with water and the mixture submitted to distillation, an odour between that of caraway and lemon was observed in the distillate, and a greasy film in the receiver indicated traces of a volatile oil as its source. Heated in a crucible, it at first blackened, giving off aromatic vapours, then intumesced and evolved inflammable gases which burnt with a smoky flame; when the charred mass was destroyed by prolonged ignition a residue was left of a grey-coloured ash consisting mainly of finely divided sand.

Chemical Composition.—The resinous colouring matter which constitutes the chief part of waras has a brittle consistence; it is of a deep garnet-red colour in bulk, and orange-red when observed in thin strata. It it soluble in ether, alcohol, benzol, chloroform, carbon disulphide, acetic acid, and in solutions of potash, soda, ammonia and the alkaline carbonates. It forms soluble compounds with lime and magnesia. It is precipitated from its solutions in the alkalies by acids in an apparently unaltered condition. Sulphuric acid dissolves it in the cold. Heated with nitric acid it rapidly oxidizes, yielding yellow-coloured products and a resin soluble in alcohol. A solution in spirit is partially precipitated by acetate of lead. Diluted alcohol appears to separate it into two resins; a soluble one of a yellow colour, and an insoluble one of a deep red. Heated with potash or soda an odour of citron is evolved. An ethereal solution of the resin allowed to evaporate spontaneously deposits a mass of crystals. The crystals are of a lighter colour than that of the surrounding red resin; examined microscopically they appear as crops of acicular prisms radiating from a common centre. Ether and other liquids were added with a view to remove the crystals from the resin or *vice versâ*, but all the volatile solvents tried resulted in forming a solution of both, and this rendered the separation an insuperable difficulty.

Besides the resinous and crystalline principles of waras, there is a volatile oil, already noticed, albuminous and saccharine matters soluble in water, and an amount of ash rarely falling below 5 per cent.

Waras and Kamala compared.—That the secretion from the pods of a leguminous shrub should have the same properties and similar constituents to the secretion from the capsules of an euphorbiaceous tree will always remain an interesting fact, but from the above description and chemical examination of waras there are so many points of resemblance to kamala, that in order to make a comparison of any value, a quantitative as well as a qualitative analysis is necessary. Dr. Anderson, of Glasgow, in 1855, worked out the proximate constituents of kamala,

which are tabulated below. By its side are placed the results of an analysis of waras made by the author:—

	Waras.	Kamala.
Resinous colouring matters .	72·83	78·19
Albuminous matter, etc. . .	8·20	7·34
Cellulose.	9·50	7·14
Water.	3·44	3·49
Ash (principally sand) . . .	6·03	3·84
Volatile oil	trace	trace
	100·00	100·00

There is a smaller proportion of resin in the waras, and as there is consequently a larger amount of aqueous extract and cellulose, this might probably account for its blackening when heated, as noticed by Hanbury. As might be expected, there is more mineral matter in waras than in kamala; so much of the *Flemingia* plant is gathered in preparing the powder, but only the capsules and stalks of *Mallotus* are taken for this purpose, so that as they are both collected in the dry weather, the former would afford more sand. In the Pharmacopœia the minimum quantity of ash indicated as yielded by kamala on ignition is 4 per cent. It may be difficult to procure a commercial article giving less than this, but the specimen used in my experiments was procured by an ordinary coolie from trees growing on the Coonoor ghaut and left only 2·86 per cent. of ash.

The following are some points of difference between the two drugs:—

	Waras.	Kamala.
Colour	purplish-red	brick-red.
Specific gravity .	1·37	1·32.
Solution in S.V.R. (1 in 20). . .	deep orange-red	orange-red.
Solution in alkali	deep crimson-brown	deep orange-red.
Heating to 100°C.	blackened	no change.
During ignition .	moderate intumescence	violent intumescence.
Boiling water. .	emulsion formed	yellow solution.
Heated with soda	odour of citron	odour of bitter almonds.

Boiling water is a very distinctive test. The Pharmacopœia does not notice the yellow colour imparted by kamala; but boiling water exercises at least a slight solvent action. The microscopic description of these two drugs has been given by Mr. W. Kirkby in a recent Journal, and by the authors of the 'Pharmacographia.'

Waras and kamala are both granular, mobile, non-hygroscopic powders of no smell or taste, and exhibit their resinous nature by rapidly igniting when thrown in the flame of a lamp. Both are insoluble in cold water, and are equally wetted when left in that medium. The solvents employed in removing the colouring matter of the one answer as well as the other. They have a lemon or melon-like odour, which is volatile and is found in the spirituous extract. They intumesce, but in different degrees, when burnt. The resinous colouring matters have the same chemical reactions, and agree in containing a crystalline constituent not easily isolated.

Dr. Anderson obtained from kamala by the agency of ether a substance named *Rottlerin*, $C_{11}H_{10}O_3$, in the form of platy yellow crystals of a fine satiny lustre. Hanbury and Groves were, however, unsuccessful in preparing it from the crude drug in a crystalline state. As the result of some later investigations, A. G. and W. H. Perkin, junior (*Ber.*, xix., 3109), have prepared and analysed *Mallotoxin*, $C_{11}H_{10}O_3$ or $C_{18}H_{16}O_5$, appearing as flesh-coloured needles, and having the property of the resin. Later still, L. Jarvein (*Ber.*, xx., 182) obtained a yellow crystalline substance melting at 200°, to which he has given the same name and formula as Dr. Anderson's educt.

The crystals observed in waras might be denominated "flemingin;" the compound promises upon ultimate analysis to belong to the same family of chemical principles as rottlerin, if it be not its twin brother.

Spectrum of the Colouring Matter of Waras.—An alcoholic tincture observed through a spectroscope showed a complete absorption as far as the Fraunhofer line D, and partial absorption up to *d*; no bands appeared in the visible portion which was formed by the red end of the spectrum. A more diluted solution gave less absorption on the violet side, consequently a wider spectrum was exposed, extending to 55° on a scale of 170°, and although the yellow, orange and red portions were seen, no bands could be distinguished.

Kamala was examined in a tincture that was made to imitate that of the waras in tint, but not in strength; the spectra of these solutions were so much allied that it was impossible to determine one from the other. My friend, Professor Michie Smith, of Madras, also kindly examined specimens of kamala and waras at my request, and he confirmed the identity of their spectroscopic characters.

Waras as a Dye-Stuff.—A dye-bath was made of waras, with solution of alum and sodium and potassium carbonates, and in the boiling liquor were separately immersed pieces of silk, wool, linen and cotton. The colour formed on the silk was a brilliant orange-brown, of a much superior tint than that on the wool, while the linen and cotton were of a dull brown, and became fainter when washed. The colour being adapted for an animal fabric, as silk, more than for vegetable tissues, is another indication of its alliance to kamala, an article used in India and elsewhere essentially as a dye for silk.

To obtain a more valuable testimony to its artistic use Mr. Lawson forwarded a large sample of waras to Sir Joseph Hooker, and from him it was sent to Mr. Thomas Wardle, the well-known silk dyer, of Leek, Staffordshire. Mr. Wardle made several experiments with the dye upon mulberry silk, Tassar silk and wool, and reports as follows:—"This substance contains only a small amount of colouring matter compared with the vegetable yellow dyes of commerce, and no colours can be obtained from it which will bear comparison in depth and richness with those of kamala, for which, it is stated in 'Kew Report' for 1880 it is used as a substitute, and which is certainly a very much more valuable dye-stuff. As far as my observations have gone waras is inferior to kamala in permanence, as regards the action of light. The colour produced by waras is easily turned brown by alkaline solutions, whilst kamala is only slightly reddened. Both dyes, however, resist the action of acids very well. Waras is a suitable dye for silk more than for wool, and it is useless as a dye for cotton. I have tried it on cotton with most of my mordants, as well as without mordant, and the result is only a very pale shade of yellow."

Sir Joseph Hooker, on receiving the specimens of China silk dyed with waras by Mr. Wardle, stated that they showed great delicacy of tint, and he did

not see why the dye, the use of which in India from an indigenous source appears to have been previously unknown, should not have at least a local interest.

Literary References.—'British Pharmacopœia,' 1885, p. 217; Hanbury's 'Science Papers,' pp. 73-83; Flückiger and Hanbury's 'Pharmacographia,' 2nd ed., p. 572; Dymock's 'Materia Medica of Western India,' 2nd ed., p. 708; Watts's 'Dictionary of Economic Products of India;' Perkin, *Journal of the Chemical Society*, March, 1887; Jarvein, *Journal of the Chemical Society*, May, 1887; Kirkby, *Pharmaceutical Journal and Transactions*, [3], vol. xiv., p. 897; Dyer, *Pharmaceutical Journal and Transactions*, [3], vol. xiv., pp. 917 and 969; Flückiger, *Pharmaceutical Journal and Transactions*, [3], vol. xvii., p. 1029; Lawson, 'Report on Government Botanical Gardens, Nilgiris,' for 1884–85; Wardle, 'Report on Waras to Kew; Madras Government (Revenue)' 1096, 1885.

Ootacamund, India.

THE CULTIVATION OF THE CASTOR OIL PLANT.*

According to a common saying the castor oil plant can be grown wherever Indian corn will grow. Yet this saying does not quite correspond with the facts, because, while it may accompany corn northwards as an ornamental plant, if the locality is favourable, its profitable cultivation is only possible in certain zones. In the United States, for instance, the northern limit is about the middle of Iowa, and as far as altitude is concerned, the castor oil shrub remains from 2000 to 3000 feet below the level at which corn may still be raised. The castor oil plant is not a food-plant like corn; its only value lies in its yield of oil; and the warmer its place of growth the more oil will it yield. Hence it would be folly to expect large profits (if any at all) from the cultivation of the castor oil plant in unsuitable localities.

The question of the applicability of any given locality for this cultivation, however, depends for answer upon still other conditions, besides atmospheric temperature. It is necessary to take into account the available moisture. In many parts of the subtropical zone the coldest period arrives at the close of the rainy season, which corresponds to the winter, This cold period must be allowed to elapse completely before sowing can take place, For neither corn nor the castor oil shrub can stand the slightest frost, and their seeds rot in the ground unless the latter is thoroughly warm. This condition is not fulfilled until after the rainy season is over. Of course, where the natural rainfall is defective, artificial irrigation may be used, but this is never as effective as the former.

Before starting any plantation of the castor oil plant, the amount of available moisture, either natural or artificial, must be thoroughly studied.

The castor oil plant requires a very rich soil, if it is to yield an ample crop, as may be seen from the following composition of the ash of the seeds :—

Lime	88·38
Magnesia	7·33
Oxide of iron	0·89
Phosphoric acid	38·65
Sulphuric acid	2·21
Chlorine	0·89
Potassa	29·52
Soda	8·75
	100·00

Attention is called to the large amount of potassa, and particularly to the extraordinarily high percentage of phosphoric acid. The plant also requires a copious supply of nitrogen. Unless the cultivation is started on virgin soil manuring can scarcely be avoided, though it would be useless to expect everything from artificial enrichment of the soil. The latter must be naturally adapted to it. It must, besides, be neither too loose nor too dense; neither stiff clay nor loose sand answers the purpose. A clayey-sand or sandy-clay bottom or alluvial ground is most conducive, provided it is of sufficient depth and porosity.

While it would be the most rational method to ascertain the capabilities and requirements of a soil by a chemical analysis of it, made from time to time—and this should be done if at all possible—yet in many cases this will be impractable. It is, therefore, of advantage to know a manuring compound which is likely to furnish all the required constituents, without doing harm by the presence of one or another in excess. Such a compound is produced by a mixture of—

Cotton seed	750 parts.
Stable manure	750 „
Superphosphates	500 „

If cotton seed cannot be obtained, the following may be used :—

Cotton seed meal	500 parts
Stable manure	1000 „
Superphosphate	500 „

These substances are to be made into a heap, under cover, and to be thoroughly moistened, in order to prevent overheating and to promote fermentation. After six weeks the mixture may be applied to the fields, from 1000 to 3000 pounds per acre, according as may be required. The soil must be turned deep, as the roots of the shrub penetrate to a considerable depth.

When the soil has been properly prepared sowing may commence. This should be done in the beginning of the rainy season, except where frosts are to be expected near its end, in which case the beginning of the hot season must be awaited. The next question to be decided is which variety is most suitable for the locality. If the common species be employed, which usually grows to the height of about 8 feet in the subtropics, the plants must be placed at intervals of 4 feet in all directions. Under the tropics the shrub grows 2 or 3 feet higher; the distance here must be 5 feet. If a still higher variety is chosen (such as *Ricinus sanguineus*), the distance should be extended to 8 feet.

In planting out on a large field, supposing the distance between the plants is determined at 5 feet, it is advisable to leave a space of 7 feet after every five rows of 5 feet apart, but only in one direction. This wider passage facilitates the harvesting.

The seed-beans are soaked for twelve hours in lukewarm water, then laid in pairs in the marked places, and covered with earth 1 inch high. As soon as the plants are 3 to 5 inches high, the weaker of the two plantlets is pulled out at every place. Sometimes four beans are planted at a time, and the two weakest ones pulled out, but this is not to be recommended. If economy of space is necessary, it is better to put the plants closer together, rather than to duplicate them in one place.

The field requires only a repeated loosening of the soil with the cultivator, not with the plough, as this penetrates too deep and injures the roots. Hence, even the cultivator must be adjusted at a rather slight depth. How often this operation should be performed depends on the weather. Four repetitions are usually sufficient. Of course, the soil in the immediate vicinity of the plant must be loosened with the hoe or rake.

So far as known to the author, the castor oil plant is only attacked by one insect, the same as infests the tobacco plant; all other insects shun it. In fact, the presence of the shrub appears to be a good agent to repel insects of all kinds. For this reason, probably, it is customary in some tropical districts to surround the field with several rows of castor oil plants, a practice that appears to deserve imitation

* Extract from 'Die Tropische Agricultur. Ein Handbuch für Pflanzer und Kaufleute,' von Heinrich Semler in San Francisco. Vol. II., 8vo, Wismar, 1887. From the *American Druggist*, June.

When the pods ripen, they turn brown, hard and brittle, and begin to burst. All pods do not ripen on the plant at the same time, but the ripening process proceeds from below upwards. Hence the harvesting must be done in several instalments. For this purpose it is quite customary to use a sort of sled, drawn by a docile horse or other animal, which is guided through the wider passages of the field, while the ripe capsules are collected at either side of it and thrown into the box of the sled. A smooth ground is previously prepared at a suitable place in the neighbourhood, and surrounded by a board fence 4 to 5 feet high. Upon this place, which must be exposed the greater part of the day to the hot rays of the sun, the capsules are piled to a depth of 3 to 4 inches, and turned over with a shovel once each day. With favourable weather, the capsules burst completely in four or five days. In order to separate still adhering seeds, a very light roller, drawn by an unshod horse, is rolled several times over the ground, the capsules being turned over before each new circuit.

The capsules and beans are then put in one heap, and the latter separated from the former by a winnower or by means of throwing with a shovel.

The ground having been cleared, it is ready for the next crop, and this is continued until the harvest is over. The shrubs are then cut down and put in the compost heap.

The clean beans are finally put in bags, and sold to the miller.

In the East Indies the oil is extracted by crushing the beans between two rollers, the mass is packed into hempen sacks, and expressed by a screw-press. The oil is mixed with water, and the latter raised to boiling. This causes the impurities to rise to the top. The oil is next strained, bleached by exposure to the sun, and transferred into casks. In Oudh, the crushed beans are boiled with water, and the oil which rises to the surface gradually dipped off.

In the United States, the usual process followed is to expose the beans in an oven for an hour to a dry heat, which has been found to facilitate the extraction of the oil. They are next transferred (in bags) to a strong screw-press, and the oil, as it runs out, immediately mixed with an equal measure of water. The mixture is boiled for an hour, which causes the coagulation and separation of the albuminoids contained in the oil. After cooling, the oil is drawn off and transferred to large zinc tanks, in which it remains eight hours. Finally, it is exposed to the sun to bleach. One hundred pounds of beans yield about 18 quarts of oil. The finest oil is obtained by a process, which, according to the author, is only partially known. The beans are first passed through rollers in which their peel or skin is taken off, which contains an oil of disagreeable taste. They are then crushed, and either cold-pressed or extracted with alcohol. The oil is finally purified by contact with acids, and the final product is a fine, clear, nearly colourless oil, almost devoid of odour and taste.

THE MANUFACTURE OF CACHETS AND WAFERS.*

The recent death of Limousin, the inventor of the wafer-capsules (cachets, capsulæ amylaceæ), suggests the idea of again drawing attention to the utility of this form of medication.

While it would be an unprofitable uudertaking for every dispensing pharmacist to undertake the preparation of his own wafers, it is believed that a profitable business could be carried on by at least one, or perhaps even more, manufacturers in each country. To a certain extent, the choice of this form of medication depends somewhat upon the rate with which its existence or availability is kept before the memory of the prescriber. It only needs a slight impetus, from time to time, to cause a preference in favour of the wafer-capsule over some other forms of medication, although it is by no means intended to assert that this is in all cases the best form. We believe, however, that it is, for instance, preferable to gelatin capsules, in the case of quinine.

Formerly, the wafer-capsules were pressed from the large square wafers (for which Nuremburg has long been celebrated); at the present time, however, they are baked specially. The cost of fitting up a factory is very small, and the arrangements required are simple, requiring but little room and only cheap labour. The most expensive item of the whole is the forms. These are made of two hinged pieces, the material being either steel or brass One of the plates contains the concave, the other the convex pattern of the wafers.

These forms rest upon one or more specially constructed ovens heated either by gas or wood charcoal. As soon as the opened forms, resting on the hot oven, have acquired the proper temperature, which is easily recognized by allowing a drop of water to fall upon them, a certain quantity of a mass prepared from wheat-starch is spread upon one of the plates and the other plate gradually folded over it. The latter, through its own weight, expands the mass so that it forms a perfectly uniform layer. The excess of the mass, which is squeezed out at the side, is simply scratched off. The forms are then opened, and the completely baked sheet taken out. This sheet contains as many half wafer-capsules as there are patterns. When freshly taken from the form, these sheets are very brittle, but after being laid aside a few days, they absorb enough moisture from the air to permit being cut or trimmed. The next operation then is the cutting or punching out of the round wafers. For this purpose there are used either simply punches, or punching machines worked by treadles, by means of which each separate wafer is cut out. These are then counted and put up in packages. A well trained girl is able to bake, in one day, 20,000 such wafers, and it requires the service of only two girls to punch these.

The mass of which the wafers are composed consists of the purest wheat-starch, mixed with water. The best fuel is either gas or wood charcoal. There being only a few requisites, it will be easy to calculate the cost of a day's turn out.

The whole art and mystery of the manufacture centres in the forms, which must be absolutely true and perfect. If the forms are not exactly true, the wafers will be uneven. The least defect of the forms will be prominently visible upon the product.

The preparation of flat wafers, such as are used for making sealing wafers, sacramental wafers, wafer-bottoms for ginger cake, etc., is much more simple than that of the medicinal wafers. The former are baked in similar metallic forms, which are, however, entirely smooth inside. The thickness of the wafers depends, of course, upon the distance intervening between the plates when they are closed.

* From the *American Druggist*.

CHANGES IN MILK PRODUCED BY FREEZING.

BY KAISER AND SCHMIEDER.

Two samples were experimented with, one was frozen slowly, the other quickly, and afterwards partially thawed, in the former case the ice contained the greater part of the fat and the fluid portion most of the casein, milk-sugar, and salts. In the quickly frozen and partially thawed sample, the fat was equally distributed between the solid and fluid portions; the author explains this by the fat globules rising to the top when the process of freezing is gradual, they thus become embedded in the flakes of ice, whilst in quickly frozen samples this cannot take place, and the fat is more evenly distributed. If a dealer whose milk has been frozen pours off the clear fluid which underlies the ice, he is liable to the suspicion of adulteration on the one hand, or will deliver milk above the standard on the other. Milk which has been frozen should be well thawed and shaken up, and not sold whilst any ice is visible.—*Bied. Centr.*, from *Journ. Chem. Soc.*

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 10, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE DEVELOPMENT OF POISON IN ARTICLES OF FOOD.

IN the address delivered on the opening of the British Association meeting at Manchester, Sir HENRY ROSCOE, while speaking of the important results arrived at by the study of micro-organisms in relation to the phenomena of fermentation and putrefaction, pointed out that although since the time when LIEBIG maintained that these phenomena were of a purely chemical character the advance had been so great as to suggest the question whether the boundaries of chemistry had not been overstepped, recent researches indicate that the microscopist must in turn again give way to the chemist in studying the causes of disease and the means of removing them. The necessity for such a transfer is made apparent by the observation that the symptoms of infective diseases are no more due to the organisms with which they are connected than alcoholic intoxication is due to the yeast cell; but that in both cases the symptoms are caused by the presence of definite chemical products generated by the microscopic organisms. Professor ARMSTRONG had also referred to the prospective tendency of research in that direction in his lecture on the Present State of our Knowledge of the Alkaloids, and he showed that consistently with the recognition of the fact that various toxic alkaloids are among the products of putrefactive changes induced by micro-organisms, it was daily becoming more and more evident that the next great advance must be mainly the outcome of the chemist's labours. This view of the subject is indeed very generally accepted, and instances in support of it are constantly being made known. Among others we may refer to the observations made by Dr. VAUGHAN last year on the presence of a poisonous substance in ice cream that was suspected to have caused illness in several persons who had partaken of it. This poisonous substance was ascertained to be identical in character with the substance which Dr. VAUGHAN had previously obtained from cheese, and to which he had given the name "tyrotoxicon." The paper in which the investigation of this subject is detailed was published at the time in the *Pharmaceutical Journal* of the 21st August, 1886, and in it attention was called to the striking similarity between the symptoms of "cholera infantum" and those produced by poisoning with tyrotoxicon.

In the "Month" of last July an account was given of some observations made by Mr. FIRTH, a surgeon on the Army Medical Staff in India, in connection with several obscure cases of poisoning that occurred at Meean Meer. The conclusion he arrived at was that a poisonous ptomaine produced in milk had given rise to the symptoms observed, and in general they appeared to be analogous to those observed by Dr. VAUGHAN. Since that time a further investigation of the subject has been carried out by Dr. VAUGHAN, in conjunction with Messrs. NOVY and RIKER, with the object of ascertaining the nature of the poisonous substance developed in the putrefaction of milk, and the conditions under which it is produced. The ultimate result of this investigation is either to identify tyrotoxicon with diazobenzene, or at least to show that it is a closely allied substance. As we are at present unable to publish Dr. VAUGHAN'S paper *in extenso*, some brief account of the experiments which led to this conclusion may be acceptable, on account of the evident importance of the subject they refer to. It was found that when normal milk was mixed with some butyric acid ferment and kept for eight or ten days in closely-stoppered bottles the poison was developed in considerable quantity. An alcoholic solution of the poison mixed with platinum chloride and evaporated left a residue that exploded with violence, but after removing the platinum from the solution by sulphuretted hydrogen the explosive property was found to have been lost. These circumstances suggested the probability of the presence of diazobenzene, as this substance forms an explosive compound with platinum chloride, and is also decomposed by sulphuretted hydrogen. In order to test this question further comparative experiments were made with tyrotoxicon obtained from milk and diazobenzene. With equal parts of sulphuric acid and carbolic acid, diazobenzene nitrate was found to give a green coloration, but with the same reagents tyrotoxicon gave a colour varying from yellow to orange-red. However, when diazobenzene nitrate was dissolved in the whey of normal milk it gave the same colour reaction as tyrotoxicon, and the purified potassium compound of tyrotoxicon gave the same green coloration as diazobenzene nitrate. This reaction may be used as a preliminary test for tyrotoxicon in milk, by placing on a porcelain plate two or three drops of sulphuric acid with the same quantity of carbolic acid, and adding a few drops of the water solution of an ether extract of the milk to be tested. If an orange-red or purple colour is produced the presence of tyrotoxicon may be suspected.

Comparative experiments as to the effects of tyrotoxicon and of diazobenzene upon animals were also considered to show that they were identical. The chief symptoms were vomiting, rapid breathing, muscular spasm over the abdo-

men, and after some time watery stools. One hundred milligrams of diazobenzene, or about one and a half grain, was sufficient to kill a large cat. *Post-mortem* examination of the animals to which tyrotoxicon and diazobenzene had been administered showed that there was not in either case any marked inflammation of the stomach or alimentary canal, but the stomach and small intestines were filled with a frothy serous fluid such as had been vomited. Altogether the results of these experiments, as well as those of chemical examination, appeared to establish the identity of tyrotoxicon and diazobenzene, and Dr. VAUGHAN is of opinion that diazobenzene or some closely allied substance will be found in all those articles of food which produce nausea, vomiting and diarrhœa in consequence of having undergone putrefactive changes. In testing milk for this poison it should be filtered, then neutralized with sodium carbonate and shaken with half its volume of pure ether. The clear ether solution is then to be allowed to evaporate spontaneously, the residue dissolved with distilled water, again extracted with ether and evaporated as before. After testing a few drops of the water solution of the ether residue, the remainder is to be mixed with caustic potash and evaporated so as to obtain the crystallizable potassium compound of diazobenzene, which will be formed if tyrotoxicon be present. In operating upon cheese the filtered aqueous extract is to be treated in the same way.

As regards the suggested identity of tyrotoxicon with diazobenzene, it may be mentioned that Dr. VAUGHAN'S account of the substance obtained by him from milk and cheese seems to leave some room for doubt. Thus, for instance, the platinum compound of diazobenzene is insoluble in alcohol, but it may be inferred from the evaporation of the strong solution of tyrotoxicon in absolute alcohol, to which platinum chloride had been added, that the compound so formed was a soluble one. Again, though tyrotoxicon was extracted by ether, it is described as being insoluble in ether when pure. This difference of behaviour is attributed by Dr. VAUGHAN to the influence of some impurity taken up by the ether; but in any case it appears that there is room for a further elucidation of the very interesting observations he has made.

In one of the most important papers read before the Conference last week, reference was made rather pointedly to the new commercial industries that have absorbed some of the work formerly done by individual pharmacists, and the absorption was explained—if not justified—as the outcome of distrust felt by leading medical men in the uniformity of official preparations and of dissatisfaction with their unpalatability. We ventured to suggest, in our summary of the paper, that the reproach, however well founded, could not be fairly laid at the door of the pharmacist, who has so little to do with the settling of official formulæ, and that the difficulty is evaded rather than overcome by the medical man prescribing palatable or convenient preparations as to the exact composition of which he is frequently ignorant. We are not much surprised, however, to find that a medical contemporary, in speaking of a similar state of affairs in the United States, attacks the practice more radically. The *Louisville Medical Herald* says that an inspection of some prescription files has afforded evidence that the United States Pharmacopœia is being "grossly neglected by practitioners of medicine," and that of the large number of new preparations introduced into the edition of 1880, few are prescribed, and those few so seldom that it would seem as if they were unknown to the general practitioner. Our contemporary is amazed that because a few proprietary preparations have proved to possess merit, medical men should neglect the Pharmacopœia "to seek false idols in unknown and mysterious compounds which are based upon no authority, and are springing into existence in vast numbers all over the country." An appeal is made for the "united efforts of the professions of medicine and pharmacy to stop the increase of these unauthorized and unscientific preparations" and especially to physicians that whenever it is practicable they should adhere to authorized standards.

* * *

As a pendant to the foregoing may be mentioned the result reported by Dr. Davenport, Chemist and Analyst for the Massachusetts Board of Health, to have been obtained in the examination of a sample of "Beef, Iron and Wine" of a well-known United States brand. Dr. Davenport states that it contained 21·6 per cent. by weight of alcohol and the contents of a one pound bottle yielded on evaporation 10·46 per cent. of solid residue. He points out that as the quantities of iron citrate and sugar represented on the label to be present would have accounted for 9·52 of this residue, only 1·04 per cent., if this statement were correct, would be left to represent the natural residue of the sherry wine itself, and of the extract of beef alleged to be present.

* * *

It will be remembered that the International Pharmaceutical Congress held in the city of Brussels decided before adjourning that the next meeting should take place in Milan, after an interval of three years. Two years have since passed, and it is evident that if the next Congress is to be held in 1888 it is time that steps were taken to carry the resolution into effect. This appears to be the opinion of Professor Gille, who, as Honorary President of the General Pharmaceutical Association of Belgium, has recently brought the subject under the consideration of the Executive of that body. Professor Gille says there is reason to believe that the Milan Society is awaiting some communication from the Executive of the Brussels Congress, whose business it is, he considers, to elaborate a scheme for the deliberations of the Congress in Milan. We may remark, *en passant*, that so far as we are aware the arrangements for the deliberations in the congresses in London and Brussels were made by the respective local organizing committees, in the former case with and in the latter without consultation with the delegates from other countries. There is, however, the resolution as to the establishment of a *Revue internationale pharmaceutique* to be dealt with, which alone may prove a somewhat difficult nut to crack. At any rate Professor Gille advises his colleagues not to make a meeting next year impracticable through any neglect on their part.

* *

We are informed by a correspondent that Mr. J. B. L. Mackay, who in 1879 received the School of Pharmacy silver medals for Chemistry and Pharmacy and Botany and Materia Medica, has been appointed Director of the School of Mines, Sandhurst, Victoria.

British Pharmaceutical Conference.

TWENTY-FOURTH ANNUAL MEETING.

(*Continued from p.* 210.)

Tuesday, August 30.

The reading of papers was then proceeded with, the first being—

A Report on Strophanthus and Strophanthin.

BY W. ELBORNE, F.L.S.,

Assistant Lecturer in Materia Medica and Pharmacy in The Owens College, Manchester.

The following is a continuation of a paper read at an evening meeting of the Pharmaceutical Society in the month of March,* since which period papers on this subject have likewise been published by Gerrard†, Fraser‡ and Merck.§

The interim has afforded me an opportunity of repeating some of the experiments detailed in my original paper with the view of their confirmation, and of submitting to your notice some further results concerning the preparation of strophanthin. The seed operated upon was the greenish-brown variety known commercially as *S. Kombé*, but appeared a finer sample than that used in my previous experiments.

Moisture.—82 grams well powdered and exposed to the temperature of 140° F. until it ceased to lose weight lost 6 grams = 7 per cent. (Gerrard, 5·5 per cent. ; Helbing, 5 per cent.) It will of course be understood that these differences are due to variation in the seed operated upon.

Fixed Oil.—56 grams of dried seed exhausted with petroleum ether yielded 11·68 grams of brownish-green oil = 20·8 per cent. on the dry seed, or 19·5 per cent. on the original. (Gerrard and Helbing, 31·0 per cent.) The oil was free from bitterness, and tested for the presence of a glucoside with negative results.

The brownish-green colouring matter of the oil thus extracted is derived from the testa or external covering of the seed, the colour of the oil of the nucleus of the seed being pale yellow ; the colour of the alcohol extract has likewise a similar origin.

Absolute Alcohol Extract.—2·5 grams of seed freed from moisture and oil were macerated in absolute alcohol for twenty-four hours and percolated to about 100 c.c., the alcohol being recovered by distillation ; the dried residue weighed ·13 gram = 3·23 per cent. on original seed. (Gerrard and Helbing, 5 per cent.)

Five grams of similar seed boiled with three successive portions of absolute alcohol yielded on recovery of the alcohol a residue of ·375 gram = 5·5 per cent. on the original seed. In either case the seed is very imperfectly exhausted, a large percentage of the active bitter principle being left in the marc.

These alcoholic extracts did not contain nitrogen, and were soluble in water without turbidity, showing that they had not been decomposed during the process of evaporation and drying. The aqueous solution was precipitated by lead subacetate and also by tannic acid, with the latter insoluble in excess ; in the former case the bitter principle is left in solution. The distinctive features exhibited by the precipitates yielded by these reagents are that on the application of heat the lead precipitate coagulates, whereas that with tannic acid dissolves and entirely disappears. The substance or some portion thereof which is precipitated from the absolute alcohol extract by subacetate of lead Fraser has termed *kombic acid.*

After the precipitation with lead subacetate, filtering, removing excess of lead with sulphuretted hydrogen (in the cold) and again filtering, the strophanthin may be removed from the filtrate by thorough agitation with two or three times the volume of amylic alcohol. The residue, after the removal of the supernatant layer and the recovery of the greater portion of the amylic alcohol by distillation, with final evaporation to dryness over a water-bath, is left in the form of a transparent film, which, on being scraped from the dish, occurs as a non-hygroscopic white powder.

If, instead of using amylic alcohol, attempts be made to obtain the strophanthin by evaporation of the filtrate by the application of heat, then partial decomposition of the glucoside into strophanthidin and glucose is effected, probably due to the acetic acid liberated by the sulphuretted hydrogen, and the dried residue will assume a brownish colour and possess a saccharine odour; that sulphuretted hydrogen alone is capable of decomposing strophanthin in aqueous solution is contrary to my experience. It is stated that aqueous solutions of strophanthin give with tannic acid an abundant white precipitate soluble in excess of either reagent, but I find that such precipitate is only obtainable in very concentrated solutions, and is soluble on the application of heat.

Some seed *divested of seed-coat* was boiled with absolute alcohol, filtered, and the filtrate evaporated to dryness over a water-bath ; after washing with ether to remove any oil the residue was left in the form of nearly colourless micaceous scales ; upon the addition of distilled water they immediately assumed a bright canary-yellow colour, readily dissolving and forming a clear yellow coloured solution. Upon the addition of lead subacetate a yellow precipitate was obtained, readily coagulated on boiling, yielding on filtration a clear colourless solution containing the bitter principle. Another portion of the original aqueous solution treated with tannin gave a precipitate, immediately soluble in slight excess of the reagent, forming a colourless solution.

Process for Preparing Strophanthin.—The only process aiming at precision, which has yet been published, is that devised by Gerrard. It is as follows :—"Dissolve the alcoholic extract in water, filtering from any insoluble residue. To the solution add tannic acid in excess, collect and wash the grey precipitate with warm water, and while still moist mix with an excess of basic acetate of lead. The mixture is to be then carefully dried, exhausted with warm alcohol, filtered, and sulphuretted hydrogen passed through the filtrate. On filtering from traces of lead sulphide and evaporating off the alcohol, strophanthin is left as a coloured residue requiring purification with charcoal."

From the above remarks on the nature of the tannic acid precipitate with the alcoholic extract, the above process is, in my opinion, open to the following objections :—(1) By using the alcoholic extract prepared by boiling the seed, the marc retains a considerable portion of the bitter principle ; (2) The use of tannin in excess as a precipitant is unsatisfactory, since on dilution with water it is more or less soluble, especially on the application of heat ; (3) The evaporation of the alcoholic solution (containing the liberated acetic acid) by the application of heat is prone to decompose the glucoside and develop colouring matter which has to be removed by charcoal.

A process which I have used with good results, is as follows :—Reduce the seed to fine powder, mix into a very thin paste with distilled water containing 10 per cent. of added alcohol, set aside for twelve hours, add six times the volume of absolute alcohol, agitate well and set aside for six hours, filter, wash the residue with rectified spirit, from the combined filtrates recover four-fifths the volume by distillation, add solution of subacetate of lead in excess to the residue, raise to the boiling point, filter, wash the precipitate with a little distilled water and allow the filtrate to cool ; through the cold filtrate pass sulphuretted hydrogen until the whole of the lead is

* *Pharm. Journ.*, [3], vol. xvii., p. 743.
† *Pharm. Journ.*, [3], vol. xvii., p. 923.
‡ *Pharm. Journ.*, [3], vol. xviii., p. 69.
§ *Pharm. Journ.*, [3], vol. xviii., p. 72.

precipitated, and filter; agitate the filtrate thoroughly with three volumes of amylic alcohol, and set aside; separate the alcoholic layer, recover the greater portion of the alcohol by distillation over a water-bath, transferring the last 1 or 2 ounces left in the retort to an open dish; upon evaporation of the latter to dryness at the temperature of a water-bath the strophanthin will be left as a colourless film, which upon removal possesses the character of a non-deliquescent white powder.

Another process:—Reduce the seed to a fine powder, macerate in four times the weight of distilled water containing 10 per cent. of added alcohol for twelve hours, strain through calico, agitate the marc with a similar menstruum and again strain. Mix the strained liquids, agitate with one-sixth the volume of petroleum ether, remove and reject the ethereal layer, to the aqueous portion add solution of subacetate of lead in excess, raise to the boiling point and filter. Through the cold filtrate pass sulphuretted hydrogen in excess, filter. By thorough agitation of the filtrate with amylic alcohol the strophanthin may be recovered as in the process above.

Tincture of Strophanthus.—The following is a modification of the existing process, by the adoption of which the seed-marc is left in a more completely exhausted condition, the colour and specific gravity of the resulting tincture remaining practically the same.

Strophanthus seed	1 oz.
Absolute alcohol	18 f. ozs.
Distilled water	3 f. ozs.
Rectified spirit } Petroleum ether }	q.s.

Reduce the seed to fine powder, dry at a temperature of 120° F., exhaust by percolation with petroleum ether until free from oil, dry the residue at 120° F. To the water add 3 fluid drachms of the absolute alcohol, mix thoroughly with the dried residue and allow to macerate for six hours; now add the remaining absolute alcohol, shake well together and set aside for twenty-four hours with occasional agitation. Filter and when the fluid ceases to pass continue the filtration with rectified spirit until 20 fluid ounces have been obtained.

The PRESIDENT, in moving a vote of thanks to Mr. Elborne, remarked that the paper had a special value from the work having been done in the laboratories of Owens College.

Mr. GERRARD had listened with great interest to this paper, having himself contributed a paper on the same subject. It was only to be expected that different results should be obtained when there was so much natural difference in the seeds, and there might also be slight differences in the condition of the solvents employed. In his own experiments he used tannic acid as the precipitant, because the substance being a glucoside it was very likely to go down as a pure body when precipitated by such an agent; and he was still inclined to favour the use of tannic acid He thought they were likely to get a more definite chemical product when a body was thrown down as a precipitate than when obtained from the evaporation of a solution either in alcohol or amylic alcohol. He was glad to hear that Mr. Elborne had obtained by means of amylic alcohol a pure body, as far as appearance went, but he regretted they had not a specimen of crystalline strophanthin as prepared by Professor Fraser. He might say that in conjunction with Dr. Vorman Kane, of Bombay, who was working at University College, he had prepared a very small portion of crystalline strophanthin by a slight modification of Professor Fraser's process. It very soon, however, underwent decomposition, possibly due to some sulphuric acid present. The quantity obtained was exceedingly small, and looking to that fact, and the high price of the seeds, it seemed that crystalline strophanthin would be one of the most expensive chemical products known. Strophanthin when produced as an amorphous glucoside must be a very uncertain product, and the substance sold under that name was of that character. There was much work yet to be done before the nature of the glucoside could be said to be known definitely. He was working in that direction, and hoped Mr. Elborne would do the same. He did not notice much reference to the oily matter removed from the strophanthus seed, but he had found during the last month that on setting it aside a crystalline body separated from it, showing that this oil was worthy of further investigation, as was also the body known as kombic acid, which united itself readily to lead. This drug should also be further studied physiologically and experiments made upon it. Tannic acid, although a good precipitant of the glucoside, did not completely remove the whole of the bitter principle. Whether what remained behind was strophanthin or some other body he could not say, but on submitting a portion of the solution from which the strophanthin had been prepared to physiological experiment, it was found exceedingly active. If he understood Mr. Elborne rightly, he used subacetate of lead to precipitate the glucoside, and removed it by sulphuretted hydrogen; but in that case he must get free acetic acid as a product, though he had criticized him for using it. Then he used amylic alcohol to shake out the strophanthin, and he would ask him whether or not amylic alcohol would dissolve acetic acid; he was not sure about it, but should imagine it would, and in that case it would be almost impossible to evaporate in the presence of acetic acid without injuring the product. The Conference was much indebted to Mr. Elborne for the further information he had given

Mr. DOTT asked if Mr. Elborne had determined the point of decomposition of strophanthin by sulphuretted hydrogen, and also its decomposition in the presence of acetic acid and sulphuretted hydrogen combined. If he understood him rightly he used alcoholic water, and afterwards added absolute alcohol, and he should like to know the object of doing this. He agreed with Mr. Gerrard as to the improbability of strophanthin itself becoming the preparation used in medicine, as the galenical preparation was sufficient for all requirements, and must necessarily be much less expensive.

Dr. SYMES thought a word on this subject might be said from the pharmaceutical point of view. Being so expensive and rare, it was not likely that for a long time strophanthin would be much heard of in pharmacy or practical medicine; the medical profession at present had to depend on the tincture. Professor Fraser had given a formula by which the tincture might be prepared, a somewhat complicated process, consisting first in extraction by ether, and then treating with alcohol. It was admitted by him that a certain small portion of the strophanthin was really removed by the ether, or at any rate the ether acquired a bitter taste. Mr. Elborne had suggested as a modification of this method the use of petroleum ether, but it was also a complicated process. All who had separated strophanthin found that treatment with water removed the alkaloid, and added alcohol to preserve it, and the plan he had adopted in a good number of experiments in making the tincture was the simplest possible, viz., to mix the powdered drug with proof spirit. He found that this exhausted the bitter principle; it did not dissolve out any appreciable quantity of oil, and as far as he was aware a perfect tincture could be made in this very simple manner. If this were so he did not see why a more complicated process should be followed.

Mr. ALCOCK asked if Mr. Elborne had examined the oily residue for strophanthin.

Mr. LONG remarked that this was a subject pre-eminently calling for scientific investigation. They had at present a great many remedies for almost every disease to which the human race was subject, but some of them

did not give satisfaction, and therefore it was a pity to leave any stone unturned under which the desired product might be found. They were continually receiving communications from all parts of the world suggesting new matters for investigation, but the results of these investigations must be left to medical men to deal with, and determine their value. Unfortunately they were also inundated with a lot of new remedies about which very little was known, and which were seldom required, and in their case further knowledge was required. If this turned out to be a useful remedy the plant might probably be cultivated and greatly reduced in price, as had been the case with cinchona, which at one time was thought to be nearly exhausted.

Mr. MABEN asked if Mr. Elborne had noticed any difference in the commercial tinctures of strophanthin. Like most others he had obtained it from different sources, and had found one sample to be of a light yellow colour, while another was perfectly clear, both being stated to be prepared according to Professor Fraser's directions, and he should like to know the explanation of this difference.

Mr. MARTINDALE said there was a formula for the tincture in the new Unofficial Formulary. The Committee had adopted Professor Fraser's process, for it was found that by using alcohol alone to exhaust the drug, the process did not go on quite so rapidly or satisfactorily as by following Professor Fraser's directions. He would ask Mr. Elborne if he found that petroleum ether got rid of the oil only, as by ethereal exhaustion some bitterness was also abstracted, and he should be glad to know why he used petroleum ether instead of pure ether, because unless there was some good reason for varying Professor Fraser's process it was better to have uniformity, and it seemed a pity to deviate from a formula given on such high authority. He had not tried Dr. Symes's process, but he had found in trying to mix the seed in powder with water there was such a quantity of albuminous matter present that it checked its miscibility with water. It was a rather curious seed in this respect, the amount of albuminous matter being very large.

Mr. ELBORNE, in reply, said he agreed with Mr. Gerrard to a great extent, but with reference to the use of tannic acid as a precipitant, he found it unsatisfactory, because the precipitate thus formed was soluble in cold water by simply washing it, as was customary. Mr. Gerrard recommended warm water, but he found the precipitate with tannic acid was then much more soluble than in cold water. The great objection to tannic acid was that a concentrated solution had to be used, and when diluted it again began to dissolve. After the meeting he should be glad to show Mr. Gerrard a sample of crystalline strophanthin prepared by Merck; he had examined it under the microscope, and while the crystals had not perfect geometrical faces he had reason to believe that the substance consisted of crystals which had been broken up by ordinary manipulation. The white strophanthin, as shaken out with amylic alcohol and then evaporated to dryness, compared favourably with the crystalline product. It was also perfectly non-deliquescent, and was perfectly stable when exposed to the atmosphere. Mr. Gerrard also asked with reference to the decomposition of strophanthin in the presence of acetic acid, whether the amylic alcohol did not dissolve out the acetic acid from an aqueous solution as well as the strophanthin. He was not prepared to say whether it did or not; he could only judge from the result, which was that the product was perfectly white, and if any decomposition had taken place the product due to the liberation of glucose would have a decided brownish colour. The first sample of fixed oil he separated from the seed yielded, on setting it aside for a few days, some perfectly formed crystals, but he presumed they were altogether different from the crystalline substance Mr. Gerrard alluded to, which was probably a crystalline fat. He had not himself observed that the oil would crystallize on the application of cold. He regretted that he had not yet had time to investigate the properties of kombic acid. The oil which he separated by means of petroleum ether did not contain any of the bitter principle. Mr. Dott had asked why he added absolute alcohol after having exhausted the seed with water; the object was to precipitate the very large quantity of albuminous matter, and thus bring the resulting mixed solution to the specific gravity of rectified spirit. Hence he obtained a better alcoholic extract by that method than by exhausting with rectified spirit alone. The addition of subacetate of lead after precipitating the albumen by means of alcohol was to precipitate a substance—he was not prepared to say whether of albuminous nature or not—but at any rate a substance associated with strophanthin not precipitated by alcohol. Whether or not the subacetate of lead would precipitate the substance precipitated by alcohol he could not say definitely, but he was of opinion that it would. In reply to Dr. Symes he might say that he had prepared several samples of tincture by means of proof spirit, but he could not say that the results were satisfactory, because on setting the tincture aside it became very cloudy, due, in his opinion, to a large quantity of albuminous matter which was extracted by the water in the proof spirit. He might also remark that a proof spirit tincture when diluted with a large volume of water, as might be the case in a mixture, and set aside for some days, underwent on escape of the alcohol a powerful decomposition, and developed a very fetid odour. In reply to Mr. Martindale he used petroleum ether because of the extreme difficulty of obtaining in the ordinary routine of business an ether sufficiently pure for the purpose of exhausting the seed. If the ether contained a very small percentage of water or alcohol, then, as all investigators had found, some portion of the bitter principle was extracted by it. In fact ether fit for this purpose would have to be specially prepared. Petroleum ether was recommended because the fixed oil thus removed did not contain any of the bitter principle. In reply to Mr. Maben, he might say that he had observed that some tinctures were more coloured than others, but that would be due probably to the kind of seeds used. There were two or three varieties of seed in the market, either one or the other of which might be used, although it was customary to use the greenish-brown variety, which had been described as the *S. Kombé*. The white variety did not contain the same colouring matter as the brownish-green, but for his part he had not noticed any great variation in the colour of tinctures.

The second paper on the list was—

CONTRIBUTIONS TO THE KNOWLEDGE OF CATHA LEAVES.

BY PROFESSOR FLÜCKIGER AND J. E. GEROCK.

Catha edulis, Forskal, is a glabrous tree or shrub, widely distributed in the interior of eastern Africa from Abyssinia to Port Natal,* which appears also to be largely cultivated throughout those regions as well as in the southern districts of Arabia.

The first scientific notice of catha is due to the Swedish botanist Peter Forskal who died in Arabia, in July, 1768, after having explored the flora of that country and lower Egypt. The statement referring to Catha will be found in the 'Flora Aegyptiaco-arabica,' Havniae, 1775, p. 63, edited by Carsten Niebuhr.

The short account of Forskal is as follows:—

"Catha. Arbor. Rami alterni, axillares; ramuli virides, annui, articulati. Folia bipoll. ovato-lanceolata, serrata, glabra, plana, nitida, patentia, rigida, opposita; in ramis magnis alterna. Petiolus superne planus, brevis . . . . Pericarpium, capsula oblongo-cylindrica, trilocularis, monosperma in quovis loculo.

"Arab. 'Gat' vel 'Kat.'

* Oliver, 'Flora of Tropical Africa,' i., 364.

"In Yemen colitur iisdem hortis cum caffea. Stipitibus plantatur.

"Arabes folia avide edunt, multum earum vires venditantes, qui copiosius comederit, vel totam vigilet noctem; asseverant quoque pestem ea loca non intrare, ubi haec colitur arbor: et hominem ramum cathæ in sinu gestantem, tuto posse inter infectos peste versari. Gustus tamen foliorum tantam virtutem indicare non videtur."

Catha edulis is now the prevailing name, although we are not aware of Forskal's having bestowed it on the plant, which was described by Richard under the name of *Catha Forskalii*. The specific name of "edulis" would appear to be partly due to Vahl, who termed the plant *Celastrus edulis* in his 'Symbolæ botanicæ,' i. (Havniae, 1790), 21.

According to Bentham and Hooker, 'Genera Plantarum,' i. (1862–1867), 361, there is but one species known of the genus *Catha*; the same is Baillon's opinion in his 'Dictionnaire de Botanique,' vol ii., p. 655. So we may quote the diagnosis of the former work as an excellent diagnosis of the plant:—

"Calyx 5-lobus, parvus. Petala 5, erecto-patentia. Stamina 5, margini disci inserta, filamentis subulatis; antherae late didymae. Discus tenuis, margine undulato. Ovarium ovoideum, disco immersum, liberum, 3-loculare; stylus brevis, crassus, stigmatibus 3 brevibus, liberis v. basi connatis; ovula in loculis gemina, e basi erecta. Capsula lineari-oblonga, 3-gona, loculicide 3-valvis, 1-3-sperma, septis medio incrassatis. Semina immatura medio septo hilo lato affixa, compressa, testa minute tuberculata, foramine dilatato infero. Frutex glaberrimus, ramulis cinereis. Folia opposita, petiolata, lanceolata, coriacea, grosse serrata. Stipulae e ciliis paucis . . . ."

Among modern travellers who became acquainted with kat in its native countries we may quote the following:—

P. E. Botta,* in 1837, found catha much in use, and largely and most carefully cultivated in the mountains of south-western Yemen, in the mountainous district of Saber, between 13° and 14° N. lat. Botta was presented by one of the sheikhs of the country with a bundle of branches of kat, according to the rules of politeness of that people. He ascertained that the leaves when chewed had an agreeable, exciting action, which imparted the desire to spend the night rather in quiet conversation than sleeping. Botta expressly states that he thought extremely pleasant that kind of excitation and the lovely dreams provoked by the use of kat. He gives an account of its virtues much reminding those of coca leaves; in Yemen kat affords the same relief, chiefly to messengers while on hard journeys, as coca does in the Cordilleras.

Every visitor being presented, in good houses, with twigs of kat, chews the leaves and throws on the floor of the reception room not only the stalks, but also those parts of the leaves which he has not swallowed. Botta, nevertheless, speaks in high terms of the green bundles of catha and their agreeable smell; he says that the leaves are strongly inebriating when freshly cut, but the intoxication does not last for a long time.

In the 'Flora' of Regensburg, xxiv., part 2 (1841), p. 662, Ch. F. Hochstetter, describing some new African genera, supposed kat to belong to an undescribed plant, and, therefore, mentioned it under the name of *Trigonotheca serrata* in the following terms:—

"Frutex foliis oppositis simplicibus lanceolatis in petiolum brevem attenuatis obtuse serratis glaberrimis luridis discoloribus . . . . Colitur ad oppidum vel pagum Abba Gerima, prope Adaua et in provincia Schiré nomine abyssinico Tschat, folia crude a Muhammedanis comeduntur et infusione aquæ ferventis potum sapidum Theae instar praebent."

In his exploration of Abyssinia and Shoa, Major Harris,* 1841–1843, repeatedly met with khat (chaat) or kath. He stated that the shrub or little tree, not exceeding 12 feet in height, was extensively cultivated in Shoa and the neighbouring countries of Kat and Kaffa (about 5° to 10° N. lat.), although it is indigenous in the western mountains, in a region of from 5000 to 8000 feet above the level of the sea, where the temperature, on an average, varies from about 15° to 16° (60° F.). The leaves of the kat are either chewed by the people or boiled with milk or water so as to take the infusion.† They also make a drink of it by adding honey; it is bitter and stimulating, and prevents sleeping if taken in excess.

In Abyssinia catha was again met with by the French expedition of Lefebvre, Petit et Quartin-Dillon, 1839–1843. The botanic results of that expedition being edited by A. Richard, this botanist devoted a page to *Catha Forskalii*, as he termed the tree, in the 'Partie Botanique,' tome iv. (Paris, 1847), 134. Among synonyms bestowed upon Forskal's catha, Hochstetter's name of *Trigonotheca* is shown by Richard to be due solely to the author's not having been aware of Forskal's description.

We need borrow only the following lines from Richard:—

". . . . fol. opposit. rarius alternis. . . . . Crescit ad pagum Abba-Gerima, prope Adaua, ubi colitur (Quartin-Dillon et Schimper), et in provincia Choa (Ant. Petit et Rocher d'Héricourt).

"Nomina vernacula, Tschut, Tohat, Tohaï."

In another French account of Abyssinia, a few years later, kat will be found under the name of *Celastrus Tsaad*, Ferret et Galinier; the tree is in fact closely allied to *Celastrus*, as already noticed by Vahl. The following account in the botanical results of that expedition‡ is of some interest:—

"Grand arbrisseau qui est appelé Tchaad, cultivé à Abbagarina et dans le Chiré. Les Mahométans, comme à Moka, mangent les feuilles crues ce qui les enivre légèrement. Les feuilles, préparées à la manière du thé, donnent une infusion assez agréable à boire."

"Les feuilles du sommet des rameaux sont parfaitement opposées, un très-léger bourrelet transversal passe du pétiole d'un côté du rameau au pétiole de l'autre côté. La base des rameaux offre des feuilles alternes, ordinairement assez rapprochées, deux par deux, pour faire voir que cette disposition n'est qu'un déplacement."

We have been also informed recently (June, 1887), by Dr. Anton Stecker, that he saw stately trees of catha near Kórata on the lake of Tâna, Abyssinia. And again, another highly competent authority, Dr. E. Glaser, now (June, 1887) at Prague, tells us that the plant is termed Kât in Southern Arabia, Tsat or Tschat in the Abyssinian idiom of Amhara. In the countries on the lake of Tâna, they call it also Kût es Salàhin. In a letter to Professor Euting of Strassburg, Dr. Glaser states that in Abyssinia the area of catha is limited to those districts south of the lake of Tsâna. The most northern region where catha is to be met with in Arabia is apparently a place north of Sanâ; it succeeds best in the valleys of 'Uppas and 'Afis, south of Sanâ, as well as in the mountains of Yemen at elevations ranging from 2200 to 2400 feet.

In Abyssinia they chew the young leaves of catha, either fresh or dried, or they use their infusion sweetened by means of honey. According to Dr. Stecker, only the Mahometans chew the drug; he is of the opinion that

* 'Relation d'un voyage dans l'Yémen, entrepris en 1837.' Paris, 1841, pp. 45, 84, 99.

* 'The Highlands of Aethiopia and Embassy to Shoa.' By Major W. Cornwallis Harris, of the Hon. E.I. Comp. Engineers. London, 1844. We have before us only the excellent German translation by K(arl) von K(illinger), 2 vols., Stuttgart, 1845–1846. The short remarks on kat will be found in vol. ii., p. 300, and in the Appendix, pp. 34 and 174.

† In a short notice of the British Vice-Consul at Hodeidah, *Pharm. Journ.*, xvii. (1887), 656, it is expressly stated that the Arabs *do not* make a decoction from kat.

‡ Ferret et Galinier, 'Voyage en Abyssinie,' iii. (1847), 109.

the plant was taken to Yemen by the Mahometans of South Abyssinia.

In 1859 James Vaughan, Assistant Surgeon, Civil and Port Surgeon at Aden, mentioned kât among other drugs observed at Aden. He speaks, in the *Pharmaceutical Journal*, vol. xii. (1859, Nov. 1), p. 268, of the strong predilection which the Arabs have for kât; the quantity used in Aden alone averages about 230 camel-loads annually. The exclusive privilege of selling it is farmed by the Government for 1500 rupees per year.

Captain Hunter, in 1877, informed one of us (F.) that in the previous year 1200 camel-loads of kât found their way to Aden, and that 8000 rupees were paid for the privilege of collecting duty on the commodity.

Vaughan gives a good representation of two bundles of kât, viz. "Subbare Kât," about 6 inches (14 centimetres) long, and Muktaree Kât," about half that size, and states that the former is considered of superior quality.

In the interior of the peninsula the use of kât seems not to be known. We are informed, for instance, by Professor Euting, that, in December, 1883, in his journey in Arabia, he was told at Hâjel by people belonging to the tribe of the Kahtânî that with them, in the Wâdî ed Dawâsir (about 19° to 22° N. lat. and 45° E. of Greenwich), kât chewing was not practised at all.

Another of the recent explorers of the interior of Arabia, Dr. Glaser, on the other hand, informed Professor Euting, that in the valley just named, as well as in the Nedjran (18° N. lat.), kât, *i.e.*, chiefly its young leaves, was chewed when Dr. Glaser paid a visit to those regions; he himself chewed the drug, which, however, he never appreciated very much.

From all the foregoing statements,* it appears that catha is much appreciated in Yemen as well as in the interior of north-eastern Africa. In a description of the island of Perim,† in speaking about the Arabs, the author says: "They also frequently come across the straits in canoes with fresh provisions of all kinds for sale .... They also sometimes bring the leaves of a shrub called *Kát*, a drug much used by the Arabs and Somalis as a pleasurable excitant, the leaves and tender shoots being said, when chewed, to produce hilarity of spirits and an agreeable state of wakefulness."

Another statement‡ is to the effect that the leaves are shipped at Berbera, on the Somali coast, for Yemen, where they find a good market; the people there chewing them say that they have an action similar to that of opium, but milder.

As the tree or shrub is also largely cultivated in the interior of southern Arabia, mostly in gardens along with coffee, bundles of twigs tied together with strips of bark find their way to Aden. The effects of the leaves being the same as those of strong Chinese green tea, a synod of learned Mussulmans issued a decree acknowledging that it was perfectly lawful to use kât, as it neither injured the health nor hindered the proper observance of religious duties. It produces wakefulness and watchfulness, so that a man may fulfil the duties of a sentry all night without a feeling of drowsiness.§

Catha appears to have been introduced some time ago in European temperate houses; in 1867, the plant flowering in the botanical garden of Basel, Dr. Christ availed himself of the opportunity of examining exhaustively the floral organs of catha, which he figured at the same time in the *Archiv der Pharmacie*, vol. cxli. (1870), p. 67-71. In an additional note, in the same periodical, cciii. (1873), p. 52, Dr. Christ very accurately described the bluntly conical capsule of catha, as ripened in the botanical garden of Lissabon. It is triangular or quadrangular, having three or four dehiscent valves, the whole fruit being 6- or 8-celled. Dr. Christ also pointed out the peculiar form of the arillus in the very small seeds of catha.

We may state here that one of us has repeatedly observed the living plant in the beautiful garden of Mr. Thomas Hanbury at La Mortola (Palazzo Orengo), near Mentone. The small stipules, as pointed out by Bentham and Hooker, *l.c.*, which Dr. Christ failed to notice in his specimens, distinctly occur in the shrub as growing at La Mortola. The largest leaves to be seen there are 11 centimetres (4½ inches) in length by 7½ centimetres (3 inches) wide; in some shoots they are opposite, in others alternate. We have branches before us showing both kinds of the arrangement of leaves. The petiole does not exceed 1 centimetre in length, but usually reaches but half a centimetre. The margins of the leaf, on each half, display, in the largest leaves, about forty short blunt teeth, ending with a glandular organ. Perhaps these glands are more developed or more active in the East. In the fresh leaves of La Mortola we failed in perceiving any marked taste or aroma, whereas Botta, as mentioned above, alluded in high terms to the pleasant smell and taste of kat. Forskal, on the other hand, was not at all aware of these virtues of the leaves. In Aden, as Professor Schär, Zürich, was informed by Mr. Escher, a correspondent of his, antiaphrodisiac powers are now attributed to catha.

It would appear that the climate and soil of Mr. Hanbury's estate at La Mortola, on the Mediterranean, are very congenial to catha; it has been most luxuriantly growing and flowering there for nearly twenty years, forming a few slender bushes 6 metres (about 18 feet) high; the largest stem is 21 centimetres in circumference (nearly 3 inches in diameter) at a distance of 10 centimetres from the earth. One of us collected there, in April, some flowering branches. Mr. Hanbury says it is in flower for months in the winter and spring, yet it has never fruited with him. It was introduced in that garden by the late Daniel Hanbury in 1868, as we are kindly informed by his brother, Mr. Thomas Hanbury.

The fine plate, No. 30, of Richard's 'Botanical Atlas' to Lefebvre, Petit et Quartin-Dillon's 'Voyage en Abyssinie,' gives an excellent figure of catha. The identity of the Mortola plant is, therefore, unquestionable; still we never met there with so narrow leaves (14 millimetres, little more than half an inch). Such a striking difference may explain that, for instance, at Harrar there are no less than four varieties of kat in the market.* The leaves we received from Aden may be said to range between Richard's figure and the Mortola plant as regards their average size, answering to the figure of "Subbare kat" of Vaughan's paper. It is, on the whole, quite natural, that a shrub or tree which is so widely distributed and so extensively cultivated should accordingly display considerable variations.

The leaves of catha are leathery, of a dull shining green on the upper surface, paler beneath, entirely glabrous and traversed by a reddish midrib giving off a system of veins running towards the edges and the apex without exhibiting any remarkable peculiarity. The same

* We omit a few others of very little interest which are mentioned by Friedrich Tiedemann, 'Geschichte des Tabaks und anderer ähnlicher Genussmittel' Frankfurt, 1854, 429.

† *The Geographical Magazine*, November 1, 1877, p. 291.

‡ *Preussisches Handelsarchiv*, 1875, ii., 404.

§ *Pharm. Journ.*, xiii. (1883), 840, from *Produce Markets Review*, March 24, 1883. An abstract will also be found in *Just's Botanischer Jahresbericht*, 1883, p. 396, No. 61, as well as in the 'Year-Book of Pharmacy,' 1883, p. 219. The same statements also occur in Captain Hunter's 'Account of the British Settlement of Aden in Arabia,' London, 1877, p. 139. All this second-hand historical information is due to the writings of Silvestre de Sacy and d'Herbelot.

* Paulitschke. Petermann's 'Geogr. Mitteilungen,' xxxi. (1885), 465. Hunter, 'Account of the Brit. Settlement of Aden,' p. 141, also mentions Sabrai kât and Makhtrai kât, from the districts in which they are produced; the latter fetching the lower price. The two varieties are evidently those figured by Vaughan, *l.c.*

applies to the anatomical structure of the leaf. The transverse section shows the usual structural elements as met with in many other leaves, without any peculiar feature. The leaves belong to that class provided with but one layer of "palissade cells" within the epidermis of the upper surface; in catha that layer is built up of a double row of those vertical, elongated "palissade cells."*

There is no evidence of catha having been used in ancient times; no mention of the leaves is met with in the great Cyclopædia of Ibn Baitâr, written about A.D. 1240. We are informed by Professor Nöldeke, that, according to S. de Sacy's 'Chrestomathie arabe,' 2nd edition, i., 462, Abdalkâdir, an author of the sixteenth century, stated that in Yemen they used "Kafta" long before they indulged in coffee. The latter was resorted to in Aden when in the time of Dhabhânî, in the fifteenth century, kafta had become a rare article, kafta, says Abdalkâdir, being the same as kât, a stimulating, not inebriating drink, which is consequently permitted like coffee. Kât would appear to mean the leaves, kafta the drink.

Similar statements will be found in D'Herbelot, 'Bibliothèque orientale,' i. (La Haye, 1777), 461, under the article "Cahnah."†

All the above statements concur in attributing eminent powers to kât, which would seem to be possibly due to caffeine.

Attfield failed in discovering caffeine in the leaves of catha (*Pharm. Journ.*, vi., 1865, p. 400), and one of us‡ likewise ascertained that they do not contain that substance. The absence of caffeine was again proved, *Pharm. Journ.*, xvii. (1887), 1009, by Dr. Paul.

Professor C. Schorlemmer, F.R.S., also devoted an interesting note§ to the leaves of caffea, thea and catha as grown in the temperate house at Kew Gardens. He ascertained the presence of caffeine in the cultivated leaves of *Caffea arabica*, *Caffea laurina* (none in those of *Caffea liberica*), *Thea viridis* and *Thea assamica*, but failed in discovering caffeine, both in the fresh leaves as well as in old ones from the museum, of *Catha edulis*. Professor Schorlemmer only isolated from catha a minute quantity of a kind of sugar, apparently mannite.

Our friend, Professor Schär, Zürich, afforded us the opportunity of examining some bundles of kat twigs of the best quality obtainable at Aden. They were about from 15 to 20 centimetres (4 to 6 inches) in length, each of them provided with about twenty leaves of average size. The leaves alone were powdered, and the powder, 1300 grams (nearly 3 lbs.), gently warmed with 5 litres ($1\frac{1}{10}$ gallon) of water containing 10 grams of oxalic acid (nearly one-third of an ounce). After a few hours the whole was packed into a percolator and the liquid drawn off the next day. The washings and the percolate were concentrated to the volume of 2 litres, and mixed with half the amount of quicklime which would have been required for saturating the oxalic acid employed. Then the brownish-green liquid was allowed to stand for some hours; it then became clear, and was evaporated to half its volume. On saturating it with caustic lye in a good excess it turned dark brown. We immediately exhausted it by shaking it repeatedly with light petroleum, boiling point from 30° to 65° C. (86° to 149° F.). The petroleum was distilled off for the most part, and the remaining liquid, about 100 c.c., shaken with five consecutive portions of dilute hydrochloric acid. On saturating the clear acid solution with an excess of caustic lye it became milky. By repeatedly shaking the turbid liquid with ether it at last became clear.

The ether, allowed to evaporate in the cold, afforded a trifling quantity, say 0·5 gram, of a thickish oily yellowish matter, which readily dissolved in dilute acetic acid, this solution giving with iodated iodide of potassium or iodohydrargyrate of potassium precipitates which are characteristic for alkaloids.

No trace of crystallization appeared in the residue from the ethereal solution, even after several days' standing at a low temperature. This alkaloid, the small amount of which did not allow of any further purification, readily dissolved in water, and this solution reddened test-paper impregnated with phenolphthalein. The red colour soon disappeared from the paper, probably due to the evaporation of the alkaloid. When the alkaloid, which might be termed *katine*, was treated with dilute acetic acid, a very trifling residue remained undissolved. The clear filtrate, carefully evaporated over concentrated sulphuric acid, yielded a decidedly *crystalline acetate of katine*. Its aqueous solution was not precipitated by tannic or picric acid, nor by chloride of platinum.

We also expressly ascertained that no caffeine was present in our "katine," which, in all probability, will prove to be a liquid when perfectly pure.

An epitome of this paper was read by Mr. NAYLOR.

The PRESIDENT, in proposing a vote of thanks to the authors, said that doubtless these catha leaves were used as coca leaves for the purpose of preventing exhaustion.

The vote of thanks to the authors was carried unanimously.

(*To be continued.*)

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* See Flückiger und Tschirch, 'Grundlagen der Pharmakognosie,' Berlin 1885, pages 162 (fig. 96), 183 (fig. 127), 184 (fig. 128), 185 (fig. 129); or English translation, by Power; New York, William Wood and Co., 1887, pages 186, 210, 211, 212, the figures just alluded to.

† Abstracted by the late Daniel Hanbury in his notes to Vaughan's paper, *Pharm. Journ.*, xii. (1852), 270.

‡ Flückiger *Archiv. der Pharmacie*, vol. cxli. (1870), 72.

§ *Chemical News*, vol. xlviii. (Nov. 9, 1883), 225.

The British Association for the Advancement of Science.

FIFTY-SIXTH ANNUAL MEETING.

THE PRESIDENT'S ADDRESS.

(*Concluded from page* 212.)

Since the days of Dalton and Prout the truth or otherwise of Prout's law has been keenly contested by the most eminent chemists of all countries. The inquiry is a purely experimental one, and only those who have a special knowledge of the difficulties which surround such inquiries can form an idea of the amount of labour and self-sacrifice borne by such men as Dumas, Stas and Marignac in carrying out delicate researches on the atomic weights of the elements. What is, then, the result of these most laborious experiments? It is that, whilst the atomic weights of the elements are not exactly either multiples of the unit or of half the unit, many of the numbers expressing most accurately the weight of the atom approximate so closely to a multiple of that of hydrogen that we are constrained to admit that these approximations cannot be a mere matter of chance, but that some reason must exist for them. What that reason is, and why a close approximation and yet something short of absolute identity exists, is as yet hidden behind the veil; but who is there that doubts that when this Association celebrates its centenary this veil will have been lifted and this occult but fundamental question of atomic philosophy shall have been brought into the clear light of day?

But these are by no means all the relationships which modern science has discovered with respect to the atoms of our chemical elements. So long ago as 1829 Döbereiner pointed out that certain groups of elements exist presenting in all their properties strongly marked family characteristics, and this was afterwards extended and insisted upon by Dumas. We find, for example, in the well-known group of chlorine, bromine and iodine, these resemblances well developed, accompanied, moreover, by a proportional graduation in their chemical and

physical properties. Thus, to take the most important of all their characters, the atomic weight of the middle term is the mean of the atomic weights of the two extremes. But these groups of triads appeared to be unconnected in any way with one another, nor did they seem to bear any relation to the far larger number of the elements not exhibiting these peculiarities.

Things remained in this condition until 1863, when Newlands threw fresh light upon the subject, showing a far-reaching series of relationships. For the first time we thus obtained a glance into the mode in which the elements are connected together, but, like so many new discoveries, this did not meet with the recognition which we now see it deserves. But whilst England thus had the honour of first opening up this new path, it is to Germany and to Russia that we must look for the consummation of the idea. Germany, in the person of Lothar Meyer, keeps, as it is wont to do, strictly within the limits of known facts. Russia, in the person of Mendelejeff, being of a somewhat more imaginative nature, not only seizes the facts which are proved, but ventures upon prophecy. These chemists, amongst whom Carnelley must be named, agree in placing all the elementary bodies in a certain regular sequence, thus bringing to light a periodic recurrence of analogous chemical and physical properties, on account of which the arrangement is termed the periodic system of the elements.

In order to endeavour to render this somewhat complicated matter clear to you, I may perhaps be allowed to employ a simile. Let us, if you please, imagine a series of human families, a French one, represented by Dumas, an English one, by name Newlands, a German one, the family of Lothar Meyer, and lastly a Russian one, that of Mendelejeff. Let us next imagine the names of these chemists placed in a horizontal line in the order I have mentioned. Then let us write under each the name of his father, and again, in the next lower line, that of his grandfather, followed by that of his great-grandfather, and so on. Let us next write against each of these names the number of years which has elapsed since the birth of the individual. We shall then find that these numbers regularly increase by a definite amount, *i.e.*, by the average age of a generation, which will be approximately the same in all the four families. Comparing the ages of the chemists themselves we shall observe certain differences, but these are small in comparison with the period which has elapsed since the birth of any of their ancestors. Now each individual in this series of family trees represents a chemical element; and just as each family is distinguished by certain idiosyncrasies, so each group of the elementary bodies thus arranged shows distinct signs of consanguinity.

But more than this, it not unfrequently happens that the history and peculiarities of some member of a family may have been lost, even if the memory of a more remote and more famous ancestor may be preserved, although it is clear that such an individual must have had an existence. In such a case Francis Galton would not hesitate from the characteristics of the other members to reproduce the physical and even the mental peculiarities of the missing member; and should genealogical research bring to light the true personal appearance and mental qualities of the man, these would be found to coincide with Galton's estimate.

Such predictions and such verifications have been made in the case of no less than three of our chemical elements. Thus, Mendelejeff pointed out that if, in the future, certain lacunæ in his table were to be filled, they must be filled by elements possessing chemical and physical properties which he accurately specified. Since that time these gaps have actually been stopped by the discovery of Gallium by Lecoq de Boisbaudron, of Scandium by Nilson, and of Germanium by Winkler, and their properties, both physical and chemical, as determined by their discoverers, agree absolutely with those predicted by the Russian chemist. Nay, more than this, we not unfrequently have had to deal with chemical foundlings, elements whose parentage is quite unknown to us. A careful examination of the personality of such waifs has enabled us to restore them to the family from which they have been separated by an unkind fate, and to give them that position in chemical society to which they are entitled.

These remarkable results, though they by no means furnish a proof of the supposition already referred to, viz., that the elements are derived from a common source, clearly point in this direction, and lend some degree of colour to the speculations of those whose scientific imagination, wearying of dry facts, revels in picturing to itself an elemental Bathybius, and in applying to the inanimate, laws of evolution similar to those which rule the animate world. Nor is there wanting other evidence regarding this inquiry, for here heat, the great analyser, is brought into court. The main portion of the evidence consists in the fact that distinct chemical individuals capable of existence at low temperatures are incapable of existence at high ones, but split up into new materials possessing a less complicated structure than the original. And here it may be well to emphasize the distinction which the chemist draws between the atom and the molecule, the latter being a more or less complicated aggregation of atoms, and especially to point out the fundamental difference between the question of separating the atoms in the molecule and that of splitting up the atom itself. The decompositions above referred to are, in fact, not confined to compound bodies, for Victor Meyer has proved in the case of iodine that the molecule at high temperatures is broken to atoms, and J. J. Thomson has added to our knowledge by showing that this breaking up of the molecule may be effected not only by heat vibrations, but likewise by the electrical discharge at a comparatively low temperature.

How far, now, has this process of simplification been carried? Have the atoms of our present elements been made to yield? To this a negative answer must undoubtedly be given, for even the highest of terrestrial temperatures, that of the electric spark, has failed to shake any one of these atoms in two. That this is the case has been shown by the results with which spectrum analysis, that new and fascinating branch of science, has enriched our knowledge, for that spectrum analysis does give us most valuable aid in determining the varying molecular conditions of matter is admitted by all. Let us see how this bears on the question of the decomposition of the elements, and let us suppose for a moment that certain of our present elements, instead of being distinct substances, were made up of common ingredients, and that these compound elements, if I may be allowed to use so incongruous a term, are split up at the temperature of the electric spark into less complicated molecules. Then the spectroscopic examination of such a body must indicate the existence of these common ingredients by the appearance in the spark spectra of these elements of identical bright lines. Coincidences of this kind have indeed been observed, but on careful examination these have been shown to be due either to the presence of some one of the other elements as an impurity or to insufficient observational power. This absence of coincident lines admits, however, of two explanations—either that the elements are not decomposed at the temperature of the electric spark, or, what appears to me a much more improbable supposition, each one of the numbers of bright lines exhibited by every element indicates the existence of a separate constituent, no two of this enormous number being identical.

Terrestrial analysis having thus failed to furnish favourable evidence, we are compelled to see if any information is forthcoming from the chemistry of the sun and stars. And here I would remark that it is not my purpose now to dilate on the wonders which this branch of modern science has revealed. It is sufficient to remind

you that chemists thus have the means placed at their disposal of ascertaining with certainty the presence of elements well known on this earth in fixed stars so far distant that we are now receiving the light which emanated from them perhaps even thousands of years ago.

Since Bunsen and Kirchhoff's original discovery in 1859, the labours of many men of science of all countries have largely increased our knowledge of the chemical constitution of the sun and stars, and to no one does science owe more in this direction than to Lockyer and Huggins in this country, and to Young in the New England beyond the seas. Lockyer has of late years devoted his attention chiefly to the varying nature of the bright lines seen under different conditions of time and place on the solar surface, and from these observations he has drawn the inference that the matching observed by Kirchhoff between, for instance, the iron lines as seen in our laboratories and those visible in the sun, has fallen to the ground. He further explains this want of uniformity by the fact that at the higher transcedental temperatures of the sun the substance which we know here as iron is resolved into separate components. Other experimentalists, however, while accepting Lockyer's facts as to the variations in the solar spectrum, do not admit his conclusions, and would rather explain the phenomena by the well-known differences which occur in the spectra of all the elements when their molecules are subject to change of temperature or change of position.

Further, arguments in favour of this idea of the evolution of the elements have been adduced from the phenomena presented by the spectra of the fixed stars. It is well known that some of these shine with a white, others with a red, and others again with a blue light; and the spectroscope, especially under the hands of Huggins, has shown that the chemical constitution of these stars is different. The white stars, of which Sirius may be taken as a type, exhibit a much less complicated spectrum than the orange and the red stars; the spectra of the latter remind us more of those of the metalloids and of chemical compounds than of the metals. Hence it has been argued that in the white, presumably the hottest, stars a celestial dissociation of our terrestrial elements may have taken place, whilst in the cooler stars, probably the red, combination even may occur. But even in the white stars we have no *direct* evidence that a decomposition of any terrestrial atom has taken place; indeed we learn that the hydrogen atom, as we know it here, can endure unscathed the inconceivably fierce temperature of stars presumably many times more fervent than our sun, as Sirius and Vega.

Taking all these matters into consideration, we need not be surprised if the earthbound chemist should, in the absence of celestial evidence which is incontestable, continue, for the present at least, and until fresh evidence is forthcoming, to regard the elements as the unalterable foundation stones upon which his science is based.

Pursuing another line of inquiry on this subject, Crookes has added a remarkable contribution to the question of the possibility of decomposing the elements. With his well-known experimental prowess, he has discovered a new and beautiful series of phenomena, and has shown that the phosphorescent lights emitted by certain chemical compounds, especially the rare earths, under an electric discharge in a high vacuum exhibit peculiar and characteristic lines. For the purpose of obtaining his material Crookes started from a substance believed by chemists to be homogeneous, such, for example, as the rare earth yttria, and succeeded by a long series of fractional precipitations in obtaining products which yield different phosphorescent spectra, although when tested by the ordinary methods of what we may term high temperature spectroscopy, they appear to be the one substance employed at the starting point. The other touchstone by which the identity, or otherwise, of these various products might be ascertained, viz., the determination of their atomic weights, has not, as yet, engaged Crookes's attention. In explanation of these singular phenomena, the discoverer suggests two possibilities. First, that the bodies yielding the different phosphorescent spectra are different elementary constituents of the substance which we call yttria. Or, if this be objected to because they all yield the same spark spectrum, he adopts the very reasonable view that the Daltonian atom is probably, as we have seen, a system of chemical complexity; and adds to this the idea that these complex atoms are not all of exactly the same constitution and weight, the differences, however, being so slight that their detection has hitherto eluded our most delicate tests, with the exception of this one of phosphorescence in a vacuum. To these two explanations, Marignac, in a discussion of Crookes's results, adds a third. It having been shown by Crookes himself that the presence of the minutest traces of foreign bodies produce remarkable alterations in the phosphorescent spectra, Marignac suggests that in the course of the thousands of separations which must be made before these differences become manifest, traces of foreign bodies may have been accidently introduced, or, being present in the original material, may have accumulated to a different extent in the various fractions, their presence being indicated by the only test by which they can now be detected. Which of these three explanations is the true one must be left to future experiment to decide.

We must now pass from the statics to the dynamics of chemistry; that, is from the consideration of the atoms at rest to that of the atoms in motion. Here again we are indebted to John Dalton for the first step in this direction, for he showed that the particles of a gas are constantly flying about in all directions; that is, that gases diffuse into one another, as an escape of coal gas from a burner, for example, soon makes itself perceptible throughout the room. Dalton, whose mind was constantly engaged in studying the molecular condition of gases, first showed that a light gas cannot rest upon a heavier gas, as oil upon water, but that an interpenetration of each gas by the other takes place. It is, however, to Graham's experiments, made rather more than half a century ago, that we are indebted for the discovery of the law regulating these molecular motions of gases, proving that their relative rates of diffusion are inversely proportional to the square roots of their densities, so that oxygen being sixteen times heavier than hydrogen, their relative rates of diffusion are one and four.

But whilst Dalton and Graham indicated that the atoms are in a continual state of motion, it is to Joule that we owe the first accurate determination of the rate of that motion, At the Swansea meeting in 1848, Joule read a paper before Section A on the "Mechanical Equivalent of Heat and on the Constitution of Elastic Fluids." In this paper Joule remarks that whether we conceive the particles to be revolving round one another, according to the hypothesis of Davy, or flying about in every direction, according to Herapath's view, the pressure of the gas will be in proportion to the *vis viva* of its particles. "Thus it may be shown that the particles of hydrogen at the barometrical pressure of 30 inches at a temperature of 60° must move with a velocity of 6225·54 feet per second in order to produce a pressure of 14·714 lbs. on the square inch;" or, to put it in other words, a molecular cannonade or hailstorm of particles, at the above rate—a rate, we must remember, far exceeding that of a cannon ball—is maintained against the bounding surface.

We can, however, go a step further and calculate with Clerk Maxwell the number of times in which this hydrogen molecule, moving at the rate of seventy miles per minute, strikes against others of the vibrating swarm, and we learn that in one second of time it must knock against others no less than 18,000,000,000 times.

And here we may pause and dwell for a moment on the reflection that in nature there is no such thing as great or small, and that the structure of the smallest

particle, invisible even to our most searching vision, may be as complicated as that of any one of the heavenly bodies which circle round our sun.

But how does this wonderful atomic motion affect our chemistry? Can chemical science or chemical phenomena throw light upon this motion, or can this motion explain any of the known phenomena of our science? I have already said that Lavoisier left untouched the dynamics of combustion. He could not explain why a fixed and unalterable amount of heat is in most cases emitted, but in some cases absorbed when chemical combination takes place. What Lavoisier left unexplained Joule has made clear. On August 25, 1843, Joule read a short communication, I am glad to remember, before the Chemical Section of our Association, meeting that year at Cork, containing an announcement of a discovery which was to revolutionize modern science. This consisted in the determination of the mechanical equivalent of heat, in proving by accurate experiment that the expenditure of energy equal to that developed by the weight of 772 pounds falling through one foot at Manchester, the temperature of one pound of water can be raised 1° Fahrenheit. In other words, every change in the arrangement of the particles is accompanied by a definite evolution or an absorption of heat. In all such cases the molecular energy leaves the potential to assume the kinetic form, or *vice versâ*. Heat is evolved by the clashing of the atoms, and this amount is fixed and definite.

Thus it is to Joule we owe the foundation of chemical dynamics and the basis of thermal chemistry. As the conservation of mass or the principle of the indestructibility of matter forms the basis of chemical statics, so the principle of the conservation of energy* constitutes the foundation of chemical dynamics. Change in the form of matter and change in the form of energy are the universal accompaniments of every chemical operation. Here again it is to Joule we owe the proof of the truth of this principle in another direction, viz., that when electrical energy is developed by chemical change a corresponding quantity of chemical energy disappears. Energy, as defined by Maxwell, is the power of doing work, and work is the act of producing a change of configuration in a system in opposition to a force which resists that change. Chemical action produces such a change of configuration in the molecules. Hence, as Maxwell says, "a complete knowledge of the mode in which the potential energy of a system varies with the configuration would enable us to predict every possible motion of the system under the action of given external forces, provided we were able to overcome the purely mathematical difficulties of the calculation." The object of thermal chemistry is to measure these changes of energy by thermal methods, and to connect these with chemical changes, to estimate the attractions of the atoms and molecules to which the name of chemical affinity has been applied, and thus to solve the most fundamental problem of chemical science. How far has modern research approached the solution of this most difficult problem? How far can we answer the question, what is the amount of the forces at work in these chemical changes? What laws govern these forces? Well, even in spite of the results with which recent researches, especially the remarkable ones of the Danish philosopher Thomsen, have enriched us, we must acknowledge that we are yet scarcely in sight of Maxwell's position of successful prediction. Thermal chemistry, we must acknowledge, is even yet in its infancy; it is, however, an infant of sturdy growth, likely to do good work in the world, and to be a credit to him who is its acknowledged father, as well as to those who have so carefully tended it in its early years.

* "The total energy of any material system is a quantity which can neither be increased nor diminished by any action between the parts of the system, though it may be transformed into any of the forms of which energy is susceptible."—*Maxwell.*

But recent investigation in another direction bids fair even to eclipse the results which have been obtained by the examination of thermal phenomena. And this lies in the region of electrical chemistry. Faraday's work relating to conductivity of chemical substances has been already referred to, and this has been since substantiated and extended to pure substances by Kohlrausch. It has been shown for example that the resistance of absolutely pure water is almost an infinite quantity. But a small quantity of an acid, such as acetic or butyric acid, greatly increases the conductivity; but more than this, it is possible by determination of the conductivity of a mixture of water with these two acids to arrive at a conclusion as to the partition of the molecules of the water between the acids. Such a partition, however, implies a change of position, and therefore we are furnished with a means of recognizing the motion of the molecules in a liquid, and of determining its amount. Thus it has been found that the hindrance to molecular motion is more affected by the chemical character of the liquid than by physical characters, such as viscosity. We have seen that chemical change is always accompanied by molecular motion, and further evidence of the truth of this is gained from the extraordinary chemical inactivity of pure unmixed substances. Thus pure anhydrous hydrochloric acid does not act upon lime, whereas the addition of even a trace of moisture sets up a most active chemical change, and hundreds of other examples of a similar kind might be stated. Bearing in mind that these pure anhydrous compounds do not conduct, we are led to the conclusion that an intimate relation exists between chemical activity and conductivity. And we need not stop here; for a method is indicated indeed by which it will be possible to arrive at a measure of chemical affinity from determination of conductivity. It has indeed been already shown that the rate of change in the saponification of acetic ether is directly proportional to the conductivity of the liquid employed.

Such wide-reaching inquiries into new and fertile fields, in which we seem to come into nearer touch with the molecular state of matter, and within a measurable distance of accurate mathematical expression, leads to confident hope that Lord Rayleigh's pregnant words at Montreal may ere long be realized: "It is from the further study of electrolysis that we may expect to gain improved views as to the nature of chemical reactions, and of the forces concerned in bringing them about; and I cannot help thinking that the next great advance, of which we have already some foreshadowing, will come on this side."

There is, perhaps, no branch of our science in which the doctrine of the Daltonian atom plays a more conspicuous part than in organic chemistry or the chemistry of the carbon compounds, as there is certainly none in which such wonderful progress has been made during the last fifty years. One of the most striking and perplexing discoveries made rather more than half a century ago was that chemical compounds could exist which, whilst possessing an identical chemical composition, that is containing the same percentage quantity of their constituents, are essentially distinct chemical substances exhibiting different properties. Dalton was the first to point out the existence of such substances, and to suggest that the difference was to be ascribed to a different or to a multiple arrangement of the constituent atoms. Faraday soon afterwards proved that this supposition was correct, and the research of Liebig and Wöhler on the identity of composition of the salts of fulminic and cyanic acid, gave further confirmation to the conclusion, leading Faraday to remark that "now we are taught to look for bodies composed of the same elements in the same proportion but differing in their qualities, they may probably multiply upon us." How true this prophecy has become we may gather from the fact that we now know of thousands of cases of this kind, and that we are able not only to explain the reason of their difference by

virtue of the varying position of the atoms within the molecule, but even to predict the number of distinct variations in which any given chemical compound can possibly exist. How large this number may become may be understood from the fact that, for example, one chemical compound, a hydrocarbon containing thirteen atoms of carbon combined with twenty-eight atoms of hydrogen, can be shown to be capable of existing in no less than 802 distinct forms.

Experiment in every case in which it has been applied has proved the truth of such a prediction, so that the chemist has no need to apply the cogent argument sometimes said to be used by experimentalists enamoured of pet theories, "When facts do not agree with theory, so much the worse for the facts!" This power of successful prediction constitutes a high-water mark in science, for it indicates that the theory upon which such a power is based is a true one.

But if the Daltonian atom forms the foundation of this theory, it is upon a knowledge of the mode of arrangement of these atoms and on a recognition of their distinctive properties that the superstructure of modern organic chemistry rests. Certainly it does appear almost to verge on the miraculous that chemists should now be able to ascertain with certainty the relative position of atoms in a molecule so minute that millions upon millions, like the angels in the schoolmen's discussion, can stand on a needle's point. And yet this process of orientation is one which is accomplished every day in our laboratories, and one which more than any other has led to results of a startling character. Still, this sword to open the oyster of science would have been wanting to us if we had not taken a step farther than Dalton did, in the recognition of the distinctive nature of the elemental atoms. We now assume on good grounds that the atom of each element possesses distinct capabilities of combination; some a single capability, others a double, others a triple, and others again a fourfold combining capacity. The germs of this theory of valency, one of the most fruitful of modern chemical ideas, were enunciated by Frankland in 1852, but the definite explanation of the linking of atoms, of the tetrad nature of the carbon atoms, their power of combination, and of the difference in structure between the fatty and aromatic series of compounds, was first pointed out by Kekulé in 1857; though we must not forget that this great principle was foreshadowed so long ago as 1833 from a physical point of view by Faraday in his well-known laws of electrolysis, and that it is to Helmholtz in his celebrated Faraday lecture that we owe the complete elucidation of the subject; for, whilst Faraday has shown that the number of the atoms electrolytically deposited is in the inverse ratio of their valencies, Helmholtz has explained this by the fact that the quantity of electricity with which each atom is associated is directly proportional to its valency.

Amongst the tetrad class of elements, carbon, the distinctive element of organic compounds, finds its place; and the remarkable fact that the number of carbon compounds far exceeds that of all the other elements put together receives its explanation. For these carbon atoms not only possess four means of grasping other atoms, but these four-handed carbon atoms have a strong partiality for each other's company, and readily attach themselves hand in hand to form open chains or closed rings, to which the atoms of other elements join to grasp the unoccupied carbon hand, and thus to yield a dancing company in which all hands are locked together. Such a group, each individual occupying a given position with reference to the others, constitutes the organic molecule. When in such a company, the individual members change hands, a new combination is formed. And as in such an assembly the eye can follow the changing positions of the individual members, so the chemist can recognize in his molecule the position of the several atoms, and explain by this the fact that each arrangement constitutes a new chemical compound possessing different properties, and account in this way for the decompositions which each differently constituted molecule is found to undergo.

Chemists are, however, not content with representing the arrangement of the atoms in one plane, as on a sheet of paper, but attempt to express the position of the atoms in space. In this way it is possible to explain certain observed differences in isomeric bodies which otherwise baffled our efforts. To Van t'Hoff, in the first instance, and more recently to Wislicenus, chemistry is indebted for work in this direction, which throws light on hitherto obscure phenomena, and points the way to still further and more important advances.

It is this knowledge of the mode in which the atoms in the molecule are arranged, this power of determining the nature of this arrangement, which has given to organic chemistry the impetus which has overcome so many experimental obstacles, and given rise to such unlooked-for results. Organic chemistry has now become synthetic. In 1837 we were able to build up but very few and very simple organic compounds from their elements; indeed the views of chemists were much divided as to the possibility of such a thing. Both Gmelin and Berzelius argued that organic compounds, unlike inorganic bodies, cannot be built up from their elements. Organic compounds were generally believed to be special products of the so-called vital force, and it was only intuitive minds, like those of Liebig and Wöhler, who foresaw what was coming, and wrote in 1837 strongly against this view, asserting that the artificial production in our laboratories of all organic substances, so far as they do not constitute a living organism, is not only probable but certain. Indeed, they went a step farther, and predicted that sugar, morphia, salicin, will all thus be prepared; a prophecy which, I need scarcely remind you, has been after fifty years fulfilled, for at the present time we can prepare an artificial sweetening principle, an artificial alkaloid, and salicin.

In spite of these predictions, and in spite of Wöhler's memorable discovery in 1828 of the artificial production of urea, which did in reality break down for ever the barrier of essential chemical difference between the products of the inanimate and of the animate world, still, even up to a much later date, contrary opinions were held, and the synthesis of urea was looked upon as the exception which proves the rule. So it came to pass that for many years the artificial production of any of the more complicated organic substances was believed to be impossible. Now the belief in a special vital force has disappeared like the *ignis fatuus*, and no longer lures us in the wrong direction. We know now that the same laws regulate the formation of chemical compounds in both animate and inanimate nature, and the chemist only asks for a knowledge of the constitution of any definite chemical compound found in the organic world in order to be able to promise to prepare it artificially.

But the progress of synthetic organic chemistry, which has of late been so rapid, was made in the early days of the half-century only by feeble steps and slow. Seventeen long years elapsed between Wöhler's discovery and the next real synthesis. This was accomplished by Kolbe, who in 1845 prepared acetic acid from its elements. But then a splendid harvest of results gathered in by chemists of all nations quickly followed, a harvest so rich and so varied that we are apt to be overpowered by its wealth, and amidst so much that is alluring and striking we may well find it difficult to choose the most appropriate examples for illustrating the power and the extent of modern chemical synthesis.

Next, as a contrast to our picture, let us for a moment glance back again to the state of things fifty years ago, and then notice the chief steps by which we have arrived at our present position. In 1837 organic chemistry possessed no scientific basis, and therefore no classification of a character worthy of the name. Writing to Berzelius in that year, Wöhler describes the condition of

organic chemistry as one enough to drive a man mad. "It seems to me," says he, "like the tropical forest primæval, full of the strangest growths, an endless and pathless thicket in which a man may well dread to wander." Still clearances had already been made in this wilderness of facts. Berzelius in 1832 welcomed the results of Liebig and Wöhler's research on benzoic acid as the dawn of a new era; and such it really was, inasmuch as it introduced a novel and fruitful idea, namely the possibility of a group of atoms acting like an element by pointing out the existence of organic radicals. This theory was strengthened and confirmed by Bunsen's classical researches on the cacodyl compounds, in which he showed that a common group of elements which acts exactly as a metal can exist in the free state, and this was followed soon afterwards by isolation of the so-called alcohol radicals by Frankland and Kolbe. It is, however, to Schorlemmer that we owe our knowledge of the true constitution of these bodies, a matter which proved to be of vital importance for the further development of the science.

Turning our glance in another direction we find that Dumas, in 1834, by his law of substitution threw light upon a whole series of singular and unexplained phenomena by showing that an exchange can take place between the constituent atoms in a molecule. Laurent indeed went farther, and assumed that a chlorine atom, for example, took up the position vacated by an atom of hydrogen and played the part of its displaced rival, so that the chemical and physical properties of the substitution-product were thought to remain substantially the same as those of the original body. A singular story is connected with this discovery. At a soirée in the Tuileries in the time of Charles X. the guests were almost suffocated by acrid vapours which were evidently emitted by the burning wax candles, and the great chemist Dumas was called in to examine into the cause of the annoyance. He found that the wax of which the candles were made had been bleached with chlorine, that a replacement of some of the hydrogen atoms of the wax by chlorine had occurred, and that the suffocating vapours consisted of hydrochloric acid given off during the combustion. The wax was as white and as odourless as before, and the fact of the substitution of chlorine for hydrogen could only be recognized when the candles were destroyed by burning. This incident induced Dumas to investigate more closely this class of phenomena, and the results of this investigation are embodied in his law of substitution. So far indeed did the interest of the French school of chemists lead them that some assumed that not only the hydrogen but also the carbon of organic bodies could be replaced by substitution. Against this idea Liebig protested, and in a satirical vein he informs the chemical public, writing from Paris under the *nom de plume* of S. Windler, that he has succeeded in substituting not only the hydrogen but the oxygen and carbon in cotton cloth by chlorine, and he adds that the London shops are now selling nightcaps and other articles of apparel made entirely of chlorine, goods which meet with much favour, especially for hospital use!

But the debt which chemistry, both inorganic and organic, thus owes to Dumas' law of substitution is serious enough, for it proved to be the germ of Williamson's classical researches on etherefication, as well as of those of Wurtz and Hofmann on the compound ammonias, investigations which lie at the base of the structure of modern chemistry. Its influence has been, however, still more far-reaching, inasmuch as upon it depends in great measure the astounding progress made in the wide field of organic synthesis.

It may here be permitted to me to sketch in rough outline the principles upon which all organic syntheses have been effected. We have already seen that as soon as the chemical structure of a body has been ascertained its artificial preparation may be certainly anticipated, so that the first step to be taken is the study of the structure of the naturally occurring substance which it is desired to prepare artificially by resolving it into simpler constituents, the constitution of which is already known. In this way, for example, Hofmann discovered that the alkaloid coneine, the poisonous principle of hemlock, may be decomposed into a simpler substance well known to chemists under the name of pyridine. This fact having been established by Hofmann, and the grouping of the atoms approximately determined, it was then necessary to reverse the process, and starting with pyridine, to build up a compound of the required constitution and properties, a result recently achieved by Ladenburg in a series of brilliant researches. The well-known synthesis of the colouring matter of madder by Graebe and Liebermann, preceded by the important researches of Schunck, and that of indigo by Baeyer, are other striking examples in which this method has been successfully followed.

Not only has this intimate acquaintance with the changes which occur within the molecules of organic compounds been utilized, as we have seen, in the synthesis of naturally occurring substances, but it has also led to the discovery of many new ones. Of these perhaps the most remarkable instance is the production of an artificial sweetening agent termed saccharin, 250 times sweeter than sugar, prepared by a complicated series of reactions from coal-tar. Nor must we imagine that these discoveries are of scientific interest only, for they have given rise to the industry of the coal-tar colours, the value of which is measured by millions sterling annually, an industry which Englishmen may be proud to remember was founded by our countryman Perkin.

Another interesting application of synthetic chemistry to the needs of everyday life is the discovery of a series of valuable febrifuges, amongst which I may mention antipyrin as the most useful. An important aspect in connection with the study of these bodies is the physiological value which has been found to attach to the introduction of certain organic radicals, so that an indication is given of the possibility of preparing a compound which will possess certain desired physiological properties, or even to foretell the kind of action which such bodies may exert on the animal economy.

But it is not only the physiological properties of chemical compounds which stand in intimate relation with their constitution, for we find that this is the case with all their physical properties. It is true that at the beginning of our period any such relation was almost unsuspected, whilst at the present time the number of instances in which this connection has been ascertained is almost infinite. Amongst these perhaps the most striking is the relationship which has been pointed out between the optical properties and chemical composition. This was in the first place recognized by Pasteur in his classical researches on racemic and tartaric acids in 1848; but the first to indicate a quantitative relationship and a connection between chemical structure and optical properties was Gladstone in 1863. Great instrumental precision has been brought to bear on this question, and consequently most important practical applications have resulted. I need only refer to the well-known accurate methods now in everyday use for the determination of sugar by the polariscope, equally valuable to the physician and to the manufacturer.

But now the question may well be put, is any limit set to this synthetic power of the chemist? Although the danger of dogmatizing as to the progress of science has already been shown in too many instances, yet one cannot help feeling that the barrier which exists between the organized and unorganized worlds is one which the chemist at present sees no chance of breaking down.

It is true that there are those who profess to foresee that the day will arrive when the chemist by a succession of constructive efforts may pass beyond albumen, and gather the elements of lifeless matter into a living structure. Whatever may be said regarding this from other standpoints the chemist can only say that at present no

such problem lies within his province. Protoplasm, with which the simplest manifestations of life are associated, is not a compound, but a structure built up of compounds. The chemist may successfully synthesise any of its component molecules, but he has no more reason to look forward to the synthetic production of the structure than to imagine that the synthesis of gallic acid leads to the artificial production of gall-nuts.

Although there is thus no prospect of our effecting a synthesis of organized material, yet the progress made in our knowledge of the chemistry of life during the last fifty years has been very great, and so much so indeed that the sciences of physiological and of pathological chemistry may be said to have entirely arisen within this period.

In the introductory portion of this address I have already referred to the relations supposed to exist fifty years ago between vital phenomena and those of the inorganic world. Let me now briefly trace a few of the more important steps which have marked the progress of this branch of science during this period. Certainly no portion of our science is of greater interest, nor, I may add, of greater complexity than that which, bearing on the vital functions both of plants and of animals, endeavours to unravel the tangled skein of the chemistry of life, and to explain the principles according to which our bodies live and move, and have their being. If, therefore, in the less complicated problems with which other portions of our science have to deal, we find ourselves, as we have seen, often far from possessing satisfactory solutions, we cannot be surprised to learn that with regard to the chemistry of the living body—whether vegetable or animal—in health or disease we are still farther from a complete knowledge of phenomena, even those of fundamental importance.

It is of interest here to recall the fact that nearly fifty years ago Liebig presented to the Chemical Section of this Association a communication in which, for the first time, an attempt was made to explain the phenomena of life on chemical and physical lines, for in this paper he admits the applicability of the great principle of the conservation of energy to the functions of animals, pointing out that the animal cannot generate more heat than is produced by the combustion of the carbon and hydrogen of his food.

"The source of animal heat," says Liebig, "has previously been ascribed to nervous action or to the contraction of the muscles, or even to the mechanical motions of the body, as if these motions could exist without an expenditure of force [equal to that] consumed in producing them." Again, he compares the living body to a laboratory furnace in which a complicated series of changes occur in the fuel, but in which the end-products are carbonic acid and water, the amount of heat evolved being dependent, not upon the intermediate, but upon the final products. Liebig asked himself the question, does every kind of food go to the production of heat; or can we distinguish, on the one hand, between the kind of food which goes to create warmth, and, on the other, that by the oxidation of which the motions and mechanical energy of the body are kept up? He thought that he was able to do this, and he divided food into two categories; the starchy or carbohydrate food is that, said he, which by its combustion provides the warmth necessary for the existence and life of the body. The albuminous or nitrogenous constituents of our food, the flesh meat, the gluten, the casein out of which our muscles are built up, are not available for the purposes of creating warmth, but it is by the waste of those muscles that the mechanical energy, the activity, the motions of the animal are supplied. We see, said Liebig, that the Esquimaux feeds on fat and tallow, and this burning in his body keeps out the cold. The Gaucho, riding on the Pampas, lives entirely on dried meat, and the rowing man and pugilist, trained on beefsteaks and porter, require little food to keep up the temperature of their bodies, but much to enable them to meet the demand for fresh muscular tissue, and for this purpose they need to live on a strongly nitrogenous diet.

Thus far Liebig. Now let us turn to the present state of our knowledge. The question of the source of muscular power is one of the greatest interest, for, as Frankland observes, it is the corner-stone of the physiological edifice and the key to the nutrition of animals.

Let us examine by the light of modern science the truth of Liebig's view—even now not uncommonly held—as to the functions of the two kinds of food, and as to the cause of muscular exercise being the oxidation of the muscular tissue. Soon after the promulgation of these views, J. R. Mayer, whose name as the first expositor of the idea of the conservation of energy is so well known, warmly attacked them, throwing out the hypothesis that all muscular action is due to the combustion of food, and not to the destruction of muscle, proving his case by showing that if the muscles of the heart be destroyed in doing mechanical work the heart would be burnt up in eight days! What does modern research say to this question? Can it be brought to the crucial test of experiment? It can; but how? Well, in the first place we can ascertain the work done by a man or any other animal; we can measure this work in terms of our mechanical standard, in kilogram-metres or foot-pounds. We can next determine what is the destruction of nitrogenous tissue at rest and under exercise by the amount of nitrogenous material thrown off by the body. And here we must remember that these tissues are never completely burnt, so that free nitrogen is never eliminated. If now we know the heat value of the burnt muscle, it is easy to convert this into its mechanical equivalent, and thus measure the energy generated. What is the result? Is the weight of muscle destroyed by ascending the Faulhorn or by working on the treadmill sufficient to produce on combustion heat enough when transformed into mechanical exercise to lift the body up to the summit of the Faulhorn or to do the work on the treadmill? Careful experiment has shown that this is so far from being the case that the actual energy developed is twice as great as that which could possibly be produced by the oxidation of the nitrogenous constituents eliminated from the body during twenty-four hours. That is to say, taking the amount of nitrogenous substance cast off from the body, not only whilst the work was being done, but during twenty-four hours, the mechanical effect capable of being produced by the muscular tissue from which this cast-off material is derived would only raise the body halfway up the Faulhorn, or enable the prisoner to work half his time on the treadmill.

Hence it is clear that Liebig's proposition is not true. The nitrogenous constituents of the food do doubtless go to repair the waste of muscle, which, like every other portion of the body, needs renewal, whilst the function of the non-nitrogenous food is not only to supply the animal heat, but also to furnish, by its oxidation, the muscular energy of the body.

We thus come to the conclusion that it is the potential energy of the food which furnishes the actual energy of the body, expressed in terms either of heat or of mechanical work.

But there is one other factor which comes into play in this question of mechanical energy, and must be taken into account; and this factor we are as yet unable to estimate in our usual terms. It concerns the action of the mind upon the body, and although incapable of exact expression, exerts none the less an important influence on the physics and chemistry of the body, so that a connection undoubtedly exists between intellectual activity or mental work and bodily nutrition. In proof that there is a marked difference between voluntary and involuntary work, we need only compare the mechanical action of the heart, which never causes fatigue, with that of the voluntary muscles which become fatigued by continued exertion. So, too, we know well

that an amount of drill which is fatiguing to the recruit is not felt by the old soldier, who goes through the evolutions automatically. What is the expenditure of mechanical energy which accompanies mental effort, is a question which science is probably far removed from answering. But that the body experiences exhaustion as the result of mental activity is a well-recognized fact. Indeed, whilst the second law of thermodynamics teaches that in none of the mechanical contrivances for the conversion of heat into actual energy can such a conversion be complete, it is perhaps possible, as Helmholtz has suggested, that such a complete conversion may take place in the subtle mechanism of the animal organism.

The phenomena of vegetation, no less than those of the animal world, have, however, during the last fifty years been placed by the chemist on an entirely new basis. Although before the publication of Liebig's celebrated report on chemistry and its application to agriculture, presented to the British Association in 1840, much had been done, many fundamental facts had been established, still Liebig's report marks an era in the progress of this branch of our science. He not only gathered up in a masterly fashion the results of previous workers, but put forward his own original views with a boldness and frequently with a sagacity which gave a vast stimulus and interest to the questions at issue. As a proof of this I may remind you of the attack which he made on, and the complete victory which he gained over, the humus theory. Although Saussure and others had already done much to destroy the basis of this theory, yet the fact remained that vegetable physiologists up to 1840 continued to hold to the opinion that humus, or decayed vegetable matter, was the only source of the carbon of vegetation. Liebig, giving due consideration to the labours of Saussure, came to the conclusion that it was absolutely impossible that the carbon deposited as vegetable tissue over a given area, as for instance over an area of forest land, could be derived from humus, which is itself the result of the decay of vegetable matter. He asserted that the whole of the carbon of vegetation is obtained from the atmospheric carbonic acid, which, though only present in the small relative proportion of 4 parts in 10,000 of air, is contained in such absolutely large quantity that if all the vegetation on the earth's surface were burnt, the proportion of carbonic acid which would thus be thrown into the air would not be sufficient to double the present amount.

That this conclusion of Liebig's is correct needed experimental proof, but such proof could only be given by long-continued and laborious experiment, and this serves to show that chemical research is not now confined to laboratory experiments lasting perhaps a few minutes, but that it has invaded the domain of agriculture as well as of physiology, and reckons the periods of her observations in the field, not by minutes but by years. It is to our English agricultural chemists Lawes and Gilbert that we owe the complete experimental proof required. And it is true that this experiment was a long and tedious one, for it has taken forty-four years to give the definite reply. At Rothamsted a plot was set apart for the growth of wheat. For forty-four successive years that field has grown wheat without addition of any carbonized manure; so that the only possible source from which the plant could obtain the carbon for its growth is the atmospheric carbonic acid. Now, the quantity of carbon which on an average was removed in the form of wheat and straw from a plot manured only with mineral matter was 1000 pounds, whilst on another plot, for which a nitrogenous manure was employed, 1500 pounds more carbon was annually removed; or 2500 pounds of carbon are removed by this crop annually without the addition of any carbonaceous manure. So that Liebig's prevision has received a complete experimental verification.

May I, without wearying you with experimental details, refer for a moment to Liebig's views as to the assimilation of nitrogen by plants—a much more complicated and difficult question than the one we have just considered—and compare these with the most modern results of agricultural chemistry? We find that in this case his views have not been substantiated. He imagined that the whole of the nitrogen required by the plant was derived from atmospheric ammonia; whereas Lawes and Gilbert have shown by experiments of a similar nature to those just described, and extending over a nearly equal length of time, that this source is wholly insufficient to account for the nitrogen removed in the crop, and have come to the conclusion that the nitrogen must have been obtained either from a store of nitrogenous material in the soil, or by absorption of free nitrogen from the air. These two apparently contradictory alternatives may perhaps be reconciled by the recent observations of Warington and of Berthelot, which have thrown light upon the changes which the so-called nitrogenous capital of the soil undergoes, as well as upon its chemical nature, for the latter has shown that under certain conditions the soil has the power of absorbing the nitrogen of the air, forming compounds which can subsequently be assimilated by the plant.

Touching us as human beings even still more closely than the foregoing, is the influence which chemistry has exerted on the science of pathology, and in no direction has greater progress been made than in the study of micro-organisms in relation to health and disease. In the complicated chemical changes to which we give the names of fermentation and putrefaction, the views of Liebig, according to which these phenomena are of a purely chemical character, have given way under the searching investigations of Pasteur, who established the fundamental principle that these processes are inseparably connected with the life of certain low forms of organisms. Thus was founded the science of bacteriology which in Lister's hands has yielded such splendid results in the treatment of surgical cases; and in those of Klebs, Koch, and others, has been the means of detecting the cause of many diseases both in man and animals; the latest and not the least important of which is the remarkable series of successful researches by Pasteur into the nature and mode of cure of that most dreadful of maladies, hydrophobia. And here I may be allowed to refer with satisfaction to the results of the labours on this subject of a committee, the formation of which I had the honour of moving for in the House of Commons. These results confirm in every respect Pasteur's assertions, and prove beyond a doubt that the adoption of his method has prevented the occurrence of hydrophobia in a large proportion of persons bitten by rabid animals, who, if they had not been subjected to this treatment, would have died of that disease. The value of his discovery is however, greater than can be estimated by its present utility, for it shows that it may be possible to avert other diseases besides hydrophobia by the adoption of a somewhat similar method of investigation and of treatment. This, though the last, is certainly not the least of the debts which humanity owes to the great French experimentalist. Here it might seem as if we had outstepped the boundaries of chemistry, and have to do with phenomena purely vital. But recent research indicates that this is not the case, and points to the conclusion that the microscopist must again give way to the chemist, and that it is by chemical rather than by biological investigation that the causes of diseases will be discovered, and the power of removing them obtained. For we learn that the symptoms of infective diseases are no more due to the microbes which constitute the infection than alcoholic intoxication is produced by the yeast-cell, but that these symptoms are due to the presence of definite chemical compounds, the result of the life of these microscopic organisms. So it is to the action of these poisonous substances formed during the life of the organism, rather than to that of the organism itself, that the special characteristics of the disease are to be traced; for it has been shown that the disease can be com-

municated by such poisons in entire absence of living organisms.

If I have thus far dwelt on the progress made in certain branches of pure science it is not because I undervalue the other methods by which the advancement of science is accomplished, viz., that of the application and of the diffusion of a knowledge of nature, but rather because the British Association has always held, and wisely held, that original investigation lies at the root of all application, so that to foster its growth and encourage its development has for more than fifty years been our chief aim and wish.

Had time permitted, I should have wished to have illustrated this dependence of industrial success upon original investigation, and to have pointed out the prodigious strides which chemical industry in this country has made during the fifty years of her Majesty's reign. As it is I must be content to remind you how much our modern life, both in its artistic and useful aspects, owes to chemistry, and, therefore, how essential a knowledge of the principles of the science is to all who have the industrial progress of the country at heart.

This leads me to refer to what has been accomplished in this country of ours towards the diffusion of scientific knowledge amongst the people during the Victorian era. It is true that the English people do not possess as yet that appreciation of the value of science so characteristic of some other nations. Up to very recent years our educational system, handed down to us from the middle ages, has systematically ignored science, and we are only just beginning, thanks in a great degree to the prevision of the late Prince Consort, to give it a place, and that but an unimportant one, in our primary and secondary schools, or in our universities. The country is, however, now awakening to the necessity of placing its house in order in this respect, and is beginning to see that if she is to maintain her commercial and industrial supremacy the education of her people from top to bottom must be carried out on new lines. The question as to how this can be most safely and surely accomplished is one of transcendent national importance, and the statesman who solves this educational problem will earn the gratitude of generations yet to come.

In conclusion, may I be allowed to welcome the unprecedentedly large number of foreign men of science who have on this occasion honoured the British Association by their presence, and to express the hope that this meeting may be the commencement of an international scientific organization, the only means nowadays existing, to use the words of one of the most distinguished of our guests, of establishing that fraternity among nations from which politics appear to remove us further and further by absorbing human powers and human work, and directing them to purposes of destruction. It would indeed be well if Great Britain, which has hitherto taken the lead in so many things that are great and good, should now direct her attention to the furthering of international organizations of a scientific nature. A more appropriate occasion than the present meeting could perhaps hardly be found for the inauguration of such a movement.

But whether this hope be realized or not we all unite in that one great object, the search after truth for its own sake, and we all, therefore, may join in re-echoing the words of Lessing: "The worth of man lies not in the truth which he possesses, or believes that he possesses, but in the honest endeavour which he puts forth to secure that truth; for not by the possession of truth, but by the search after it are the faculties of man enlarged, and in this alone consists his ever-growing perfection. Possession fosters content, indolence and pride. If God should hold in His right hand all truth, and in His left hand the ever-active desire to seek truth, though with the condition of perpetual error, I would humbly ask for the contents of the left hand, saying, 'Father, give me this; pure truth is only for Thee.'"

Obituary.

Notice has been received of the death of the folowing:—

On the 19th of August, suddenly, in the Isle of Man, while away from home for a holiday, Mr. Henry Field, Chemist and Druggist, of Pindersfields Road, Wakefield, Aged 39 years.

On the 22nd of August, Mr. Thomas John T. Corfield. Pharmaceutical Chemist, St. Day, Cornwall. Aged 72 years. Mr. Corfield had been a Member of the Pharmaceutical Society since 1853.

On the 29th of August, at Eastbourne, Mr. James Southward Farlow, Chemist and Druggist, of Brook Green, Hammersmith. Aged 24 years. Mr. Farlow was an Associate of the Pharmaceutical Society.

On the 2nd of September, Mr. Thomas Harrison, Chemist and Druggist, of Bradford, Yorkshire. Aged 77.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

NOTE ON THE BOTANICAL IDENTIFICATION OF HAMAMA.

Sir,—I must ask to be allowed to make one correction in the interesting article by Mr. Holmes on this curious drug. He remarks that "for some years" it "remained unidentified . . . . in the Museum of Kew." In justice to the Staff I must point out that this is not exactly the case. At the end of 1879 the extensive economico-botanical collections forming part of the India Museum at South Kensington were removed to Kew. Amongst them were found fine specimens from Bombay of hamama, which the Kew Museum did not previously possess. These were identified May, 1880, with *Dionysia Kotschyi*, Bunge, by Mr. N. E. Brown, A.L.S., one of the assistants in the Herbarium, and a very acute botanist. The specimens in the Museum have been labelled accordingly for the last seven years.

In the course of the present summer Professor Baillon brought to Kew a fragment closely resembling our Bombay specimens. Mr. W. B. Hemsley, A.L.S., who is assisting Dr. Aitchison in working up his Afghan collections, pointed out its probable identity with *Dionysia diapensiæfolia*, Boiss., and Professor Oliver concurred in this view of its origin.

I may, therefore, claim that the credit of assigning to its proper place in the vegetable kingdom a drug, the origin of which had been unknown from, at any rate, the sixteenth century, is due to Mr. Brown. The additional evidence obtained by Mr. Holmes is a valuable confirmation. It is true that Mr. Brown did not identify it with the right species of *Dionysia*. But the species of the genus are very critical and closely allied, and Mr. Brown informs me that *Dionysia diapensiæfolia* was the species he really had in view, and that he thought—as it appears erroneously—that *Dionysia Kotschyi* was a synonym of this.

W. T. THISELTON DYER.

Llanddwyn.—*Euphorbia Paralias.*

Llanfair.—The *Veterinarian.* Monthly. Longmans.

Lindum.—(1) Antifebrin is sparingly soluble in cold water, but freely soluble in alcohol. Information respecting it has appeared in this Journal on several occasions within the last twelve months. See the number for April 30, p. 899. (2) Magnes. carb. pond., unless otherwise ordered.

Alpha.—The subject is better suited for discussion in a medical journal.

T. Davies.—Varying results of analyses of wheat and rye bran will be found in Watts's 'Dictionary,' vol. i.

W. F. Clayton.—We have no knowledge of such a substance.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Stembridge, Tichborne, Islip, Dunn, Gould, Young, Chapman, Harvey, Long, Dott, Symes, Rogers, Christy, Collier, Helbing, Naylor.

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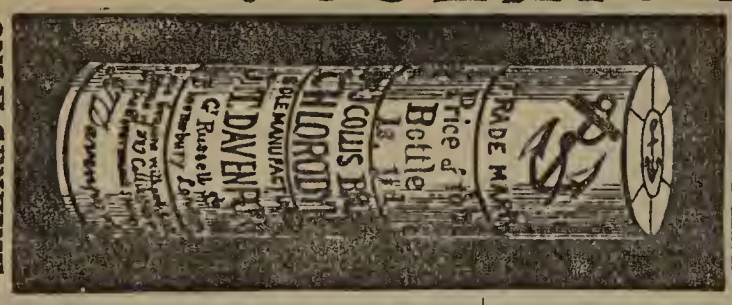

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DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

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IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

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Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John, & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
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Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
Evans, Lescher & Webb	,,	Mander, Weaver	Wolverhampton.	Woolley, James	Manchester.
Evans, Gadd & Co.	Exeter.	Marsden & Sons	London.	Wylcys & Brown	Coventry.
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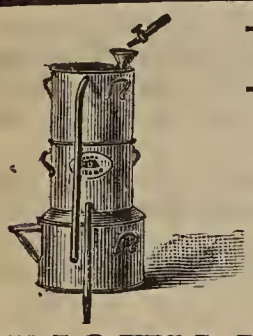

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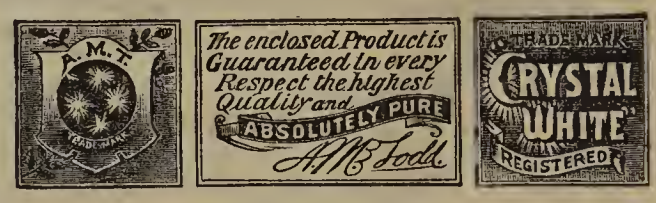

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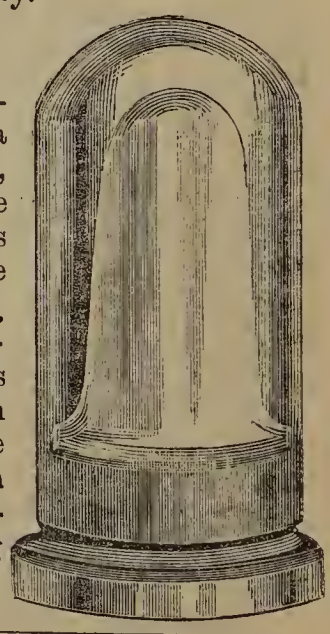

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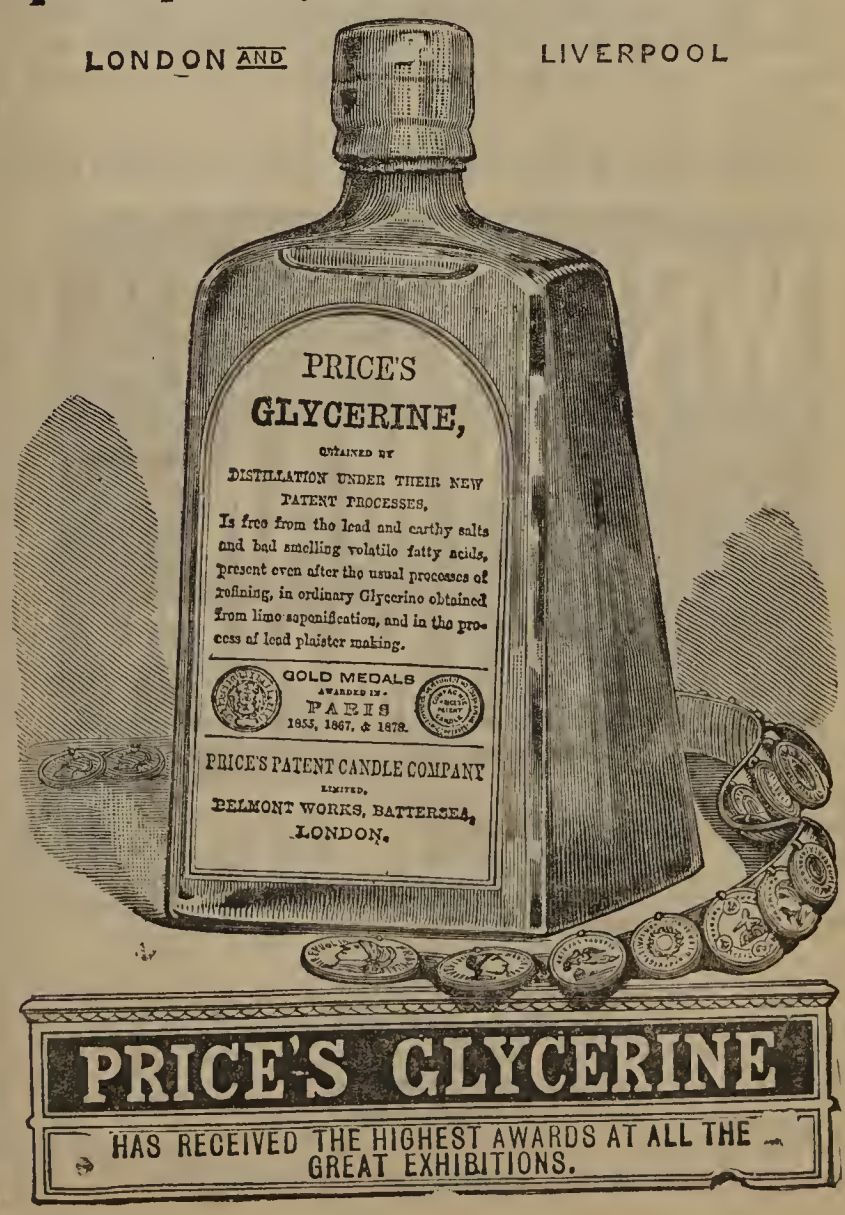

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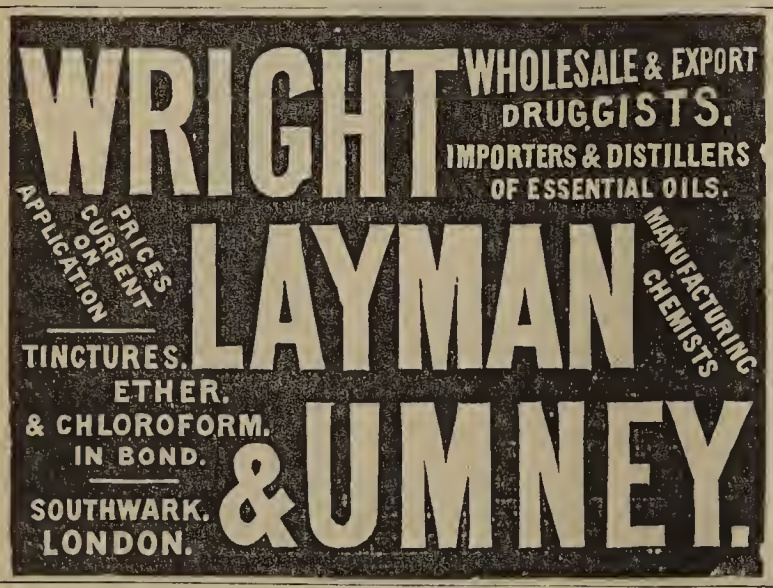

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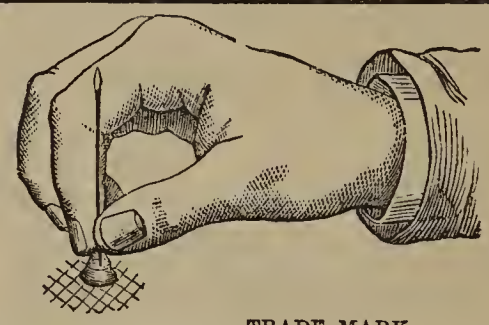

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„ C. C. Islip.	„ H. Roberts.
„ G. Jeffries.	„ J. Shaw.
„ A. H. King.	„ S. Shillcock.
„ G. J. Kirkup.	„ A. C. T. Smith.
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„ W. Markham.	„ J. R. Tite.
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Have been organised, by which gentlemen engaged during the day, and unable to leave business to attend the Day Lectures, may be prepared IN THE EVENING for the various examinations of the Pharmaceutical Society.

Practical Analysis, 7 till 8; Class, 8 till 9.

Tuesdays, for the December Examination, fee £1 1s.
Thursdays „ October „ „ 10s. 6d.
These Classes are conducted by Mr. Wills.
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For Prospectus, apply to MESSRS. WILLS & WOOTTON, TRINITY SQUARE, BOROUGH, LONDON, S.E.

THE

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ESTABLISHED 1ST OCTOBER, 1868.

THE TWENTIETH SESSION, 1887-8,
Will commence on the 12th September.
For Fees, &c., apply to W. BAXTER, Secretary.

THE LIVERPOOL SCHOOL OF PHARMACY,

36, OXFORD STREET, LIVERPOOL.

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The pass list increases every session. . . . 48 % of the successful Minors have passed at their first attempt. . . . During the last session all the Major and all the Preliminary pupils sent in passed.

The New Session commenced on Sept. 5th.

Syllabus, with terms, pass list, &c., sent free on application

The Middlesex Hospital Medical SCHOOL.

The WINTER SESSION, 1887-8, will open on Monday, October 3rd, at 3 p.m., when the Prizes awarded during the previous Winter and Summer Sessions will be distributed by THE RT. HON. THE LORD MAYOR OF LONDON, followed by a Reception in the New Buildings.

The ANNUAL DINNER of the past and present Students and their friends will take place the same evening, at the Holborn Restaurant, at 7 o'clock, T. W. NUNN, Esq., in the Chair.

HOSPITAL STAFF.

Consulting Physicians—Dr. Henry Thompson, Dr. Goodfellow, Dr. Greenhow, F.R.S.
Physicians—Dr. Cayley, Dr. Coupland, Dr. Douglas Powell, Dr. David W. Finlay.
Assistant Physicians—Dr. J. K. Fowler, Dr. C. Y. Biss, Dr. J. J. Pringle.
Obstetric Physician—Dr. Arthur W. Edis.
Physician to Skin Department—Dr. Robert Liveing.
Assistant Obstetric Physician—Dr. W. Duncan.
Consulting Surgeons—Mr. Shaw, Mr. Nunn.
Surgeons—Mr. J. W. Hulke, F.R.S., Mr. George Lawson, Mr. Henry Morris.
Assistant Surgeons—Mr. Andrew Clark, Mr. A. Pearce Gould, Mr. J. Bland Sutton.
Ophthalmic Surgeon—Mr. William Lang.
Aural Surgeon—Mr. Arthur Hensman.
Consulting Surgeon-Dentists—Sir John Tomes, F.R.S., Mr. J. S. Turner.
Dental Surgeon—Mr. Storer Bennett.
Assistant Dental Surgeon—Mr. W. Hern.
Curator of Museum and Pathologist—Dr. J. K. Fowler.
Registrars—Dr. W. Pasteur and Mr. W. Roger Williams, F.R.C.S.
Chloroformists—Mr. G. Everitt Norton, Dr. McCausland.
Resident Medical Officer—Mr. E. A. Fardon.

LECTURERS.

Principles and Practice of Medicine—Dr. Cayley.
Principles and Practice of Surgery—Mr. Morris, M.A., M.B.
Practical Medicine and Therapeutics—Dr. Coupland, Dr. Douglas Powell.
Practical Surgery—Mr. Andrew Clark.
Physiology and General Anatomy—Mr. B. Thompson Lowne, F.L.S.
Descriptive and Surgical Anatomy—Mr. Arthur Hensman.
Chemistry and Practical Chemistry—Mr. W. Foster, M.A. Cantab.
Pathological Anatomy—Dr. J. K. Fowler, M.A.
Dissecting-room—Mr. Hensman, Mr. J. B. Sutton, Mr. C. G. Brodie, and Mr. B. Lawson.
Midwifery and Diseases of Women and Children—Dr. A. W. Edis.
Practical Midwifery—Dr. W. Duncan.
Materia Medica and Therapeutics—Dr. Thorowgood.
Forensic Medicine—Dr. D. W. Finlay, B.A.
Botany—Dr. Biss, M.A. Cantab.
Practical Physiology and Histology—Mr. B. Thompson Lowne, F.L.S.
Public Health—Dr. D. W. Finlay, B.A.
Psychological Medicine—Dr. W. J. Mickle.
Comparative Anatomy and Zoology—Mr. J. B. Sutton.
Dermatology—Dr. Liveing, M.A. Cantab.
Clinical Lectures on Medicine—Dr. Cayley, Dr. Coupland, Dr. Douglas Powell, Dr. D. W. Finlay, B.A.
Clinical Lectures on Surgery—Mr. Hulke, F.R.S., Mr. George Lawson, Mr. Morris.
Clinical Lectures on Diseases of Women and Children—Dr. Arthur W. Edis.
Clinical Lectures on Diseases of the Eye—Mr. William Lang.
Practical Demonstrations on Diseases of the Throat and Ear—Mr. Hensman.

The Hospital contains 310 beds. There are special Departments for Cancer, Diseases of the Eye, Diseases of Women and Children, and Syphilis. In the Out-patients' Department special days are devoted to Diseases of Children, the Throat and Ear, the Skin, and cases requiring Electrical treatment.

There are sixteen Resident Clinical Appointments open to Students of the Hospital annually.

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Clerkships and Dresserships are awarded without fee, and the Clerk and Dresser of the week dine at the board-room table to have the opportunity of seeing cases that may be admitted during the evening.

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Inclusive Fee £100, or by three yearly Instalments of £45, £40 and £25.

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Special arrangements are made for the convenience of Dental Students.

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For further information apply at the Hospital to the Resident Medical Officer, or to

A. PEARCE GOULD, Dean.

The London Hospital and Medical COLLEGE, Mile End, E.

The SESSION 1887-88 will commence on Saturday, October 1st, 1887. The New Buildings, which were opened by T.R.H. The Prince and Princess of Wales, on May 21st, afford more than double the accommodation which was provided formerly.

FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All Resident and other Hospital Appointments are free, and the holders of all the Resident Appointments are provided with rooms and board entirely free of expense. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, one Accoucheurship, and one Receiving-room Officer; Dressers and Maternity Pupils also reside in the Hospital. Special Classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London, and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England, are held throughout the year. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, Metropolitan District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply, personally or by letter to MUNRO SCOTT, Warden.

St. Thomas's Hospital Medical School, Albert Embankment, London, S.E.

The WINTER SESSION of 1887-88 will commence on OCTOBER 1, when an Introductory Address will be delivered by R. W. REID, Esq., F.R.C.S., at 3 p.m.

Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

All Hospital appointments are open to students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several medals.

The fees may be paid in one sum or by instalments. Entries may be made to lectures or to Hospital practice, and special arrangements are made for students entering in their second or subsequent years, also for dental students and for qualified practitioners.

Several medical practitioners and private families residing in the neighbourhood receive students for residence and supervision, and a register of approved lodgings is kept in the secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

R. W. REID, Vice-Dean.

Owens College, Victoria University, MANCHESTER. PHARMACEUTICAL DEPARTMENT.

The classes at the College qualify for the Pharmaceutical Society's Examinations. Full particulars will be forwarded on application to H. W. HOLDER, M.A., Registrar.

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W. WILLIAMS, F.R.S.E., F.R.C.V.S., *Principal.*

The WINTER SESSION, 1887-88, will commence on Wednesday, the 5th October, when a Preliminary Examination will be held. Prospectus on application to the Secretary.

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J. R. DORE, Pharmaceutical Chemist by examination, New St., Huddersfield, can highly recommend a young man, age 21, as a Junior ASSISTANT.

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AS ASSISTANT or DISPENSER. Qualified. Age 24. Good experience. MINOR, 13, Castle Meadow, Norwich.

ASSISTANT or DISPENSER. Age 23. Qualified. Good references. CHEMIST, 118, Moor, Sheffield.

AS ASSISTANT. Time for study desired. Good experience. Age 23. S. E. CLARKE, 29, St. Stephen's Sq., Norwich.

JUNIOR or DISPENSER to Surgeon. Age 21. A. B., Mr. Harrison, Chemist, Salisbury.

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A THOROUGHLY competent ASSISTANT, in-doors, for Retail counter, who has had experience in a good provincial house. Good address and recommendation indispensable. State age, height, salary required, references with photo, to BETA, care of Wright, Layman, & Umney, Southwark St., S.E.

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IMMEDIATELY. A competent ASSISTANT for a good class Dispensing business. Apply, enclosing carte, to be returned, and stating age, reference, &c. to Messrs. LONG & STRICKLAND, Pharmaceutical Chemists, Bognor, Sussex.

JUNIOR or IMPROVER. In-doors. No Sunday duty. Apply, stating age, height, salary required and references, to J. HILL, Chemist, Bacup, Lancs.

STUDENT for Minor, not under 25, wanted to take entire charge of small Retail for 3 months in-door. In return for services a 9 guinea course at Wills and board and lodging. Scotchman preferred. If able to Extract Teeth, it will be to his own advantage. Address, 95, PETROLEUM, City News Rooms, Ludgate Circus, E.C.

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ASSISTANT, in first-class Retail and Dispensing business. State age, height, and salary required, enclosing photo if convenient, to PHARMACIST, Messrs. Sanger & Sons, 489 Oxford St., London.

ASSISTANTS WANTED.

IMMEDIATE. Energetic, qualified ASSISTANT, accustomed to first-class business. About 24. Outdoors. Apply with carte and usual particulars, JAMESON & CURTIS, Hastings.

3RD October.—Competent ASSISTANT, who has had first-class Dispensing experience. Not under 24 years of age, and with Minor qualification. Salary £70. J. COLBY & Co., 101, Western Rd., Brighton.

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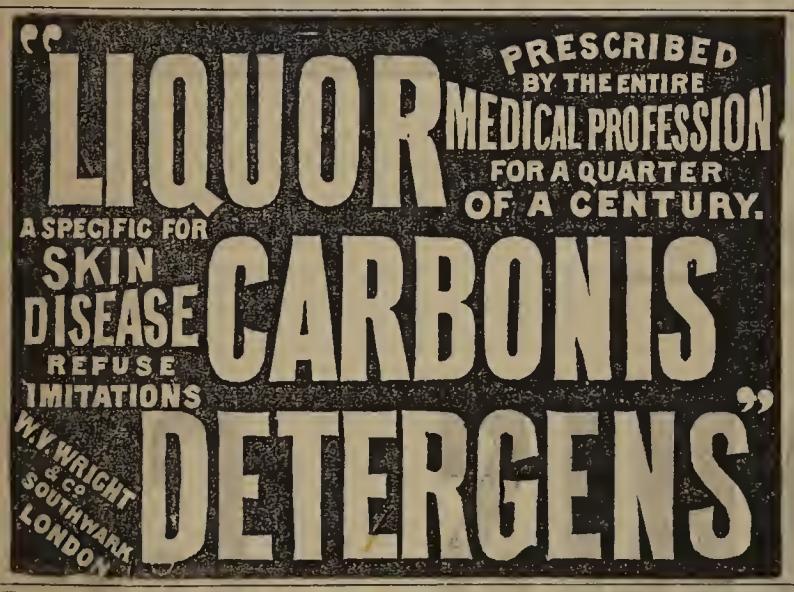

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The
Pharmaceutical Journal
AND
Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

LIBRARY AND MUSEUM.
SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during September.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *forty-six* annuitants, receiving £1575 per annum, and casual relief is also granted, amounting to upwards of £600 per annum, involving a total annual expenditure of about £2200.

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Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-SIXTH SESSION, 1887—88.

COMMENCING on MONDAY, OCTOBER 3rd, at 9 a.m.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.
Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

Professor WYNDHAM DUNSTAN .....CHEMISTRY.
Professor ATTFIELD ....PRACTICAL CHEMISTRY.
Professor GREEN .....BOTANY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.
Mr. HOLMES .....MATERIA MEDICA.

At 8 p.m. on Wednesday, October 5th, the School Prizes will be distributed and an Address to the Students will be delivered by Sir DYCE DUCKWORTH, *M.D., F.R.C.P., Treasurer of the Royal College of Physicians, London. All students and friends, ladies as well as gentlemen, are invited to be present.*

CHEMISTRY.

Lectures on Monday, Tuesday and Wednesday mornings, at 9 o'clock, comprising the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.
3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures. First Course, October to February. Second Course, March to July.

PRACTICAL CHEMISTRY.

Daily, at 10 o'clock, in the Laboratory, by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore enter for any period at any date. A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

BOTANY.

Lectures on Friday and Saturday mornings, at 9 o'clock, comprising the following subjects:—

1st Course.—Structural Botany, and the Physiology of the plant. October to February.

2nd Course.—Structural and Physiological Botany, but with especial reference to Practical Botany and the Classification of plants. March to July.

All the lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

MATERIA MEDICA.

Demonstrations in Vegetable and Animal Materia Medica every Thursday Morning, at 10. First Course from October to February; Second Course from March to July.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations every Tuesday, Thursday and Friday, at 5 p.m. First Course from October to February. Second Course from March to July.

Application for admission to the School, for Prospectuses, or for further information, may be made, personally or by letter, to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

THE PHARMACEUTICAL JOURNAL

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3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

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Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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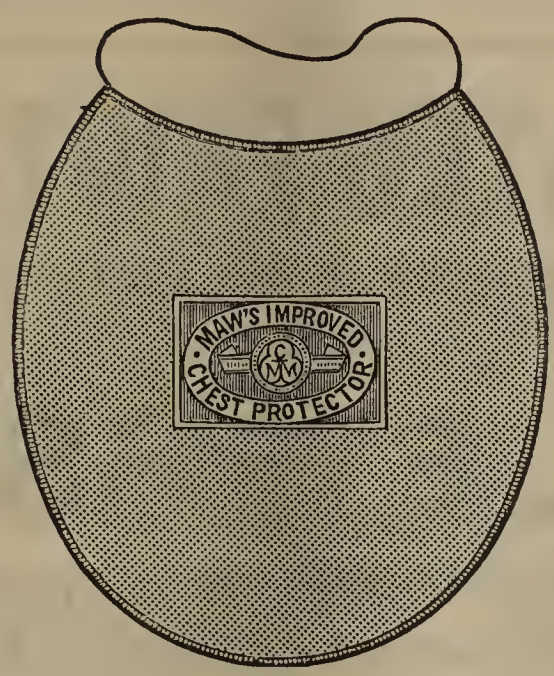

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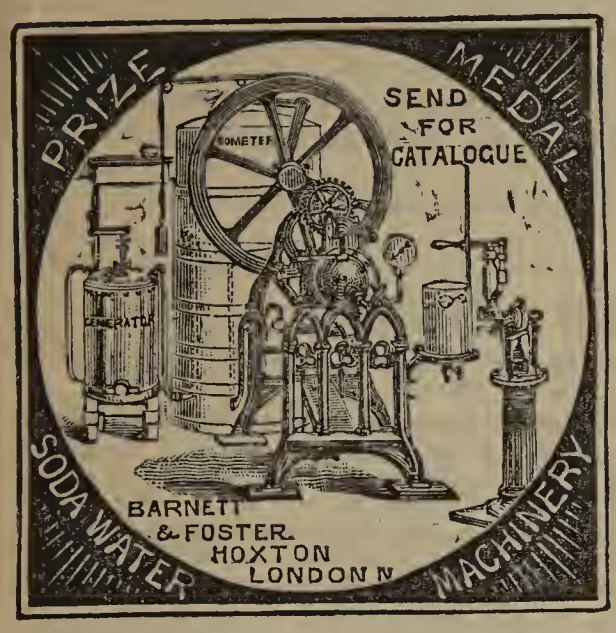

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SOME HIGHER HOMOLOGUES OF COCAINE.*

BY PROFESSOR F. G. NOVY.

Cocaine is the methyl ester of benzoylecgonine. The latter compound does not occur in nature ready-formed, but is obtained by the hydrolysis of cocaine, the cocaine splitting up into benzoylecgonine and methyl alcohol according to the following formula—

$$C_{17}H_{21}NO_4 + HOH = C_{16}H_{19}NO_4 + CH_3OH.$$

By the treatment of benzoylecgonine with methyl iodide and methyl alcohol it is easily converted into cocaine. Similarly when the higher alkyl iodides are used the corresponding homologues of cocaine are obtained.

The ethyl ester of benzoylecgonine was first prepared in 1885 and studied by W. Merck; he obtained it by heating benzoylecgonine together with ethyl iodide and ethyl alcohol for eight hours at a temperature of 100° C. in a sealed tube. This method was also used in the preparation of the homologues referred to in this paper.

Ethylbenzoylecgonine ($C_{16}H_{18}(C_2H_5)NO_4$).—Several grams of benzoylecgonine were heated for five hours at a temperature of 95° C. with ethyl iodide in slight excess of the quantity theoretically required and some absolute alcohol. After cooling, the glass tube was opened and the contents gently warmed in a porcelain dish to remove excess of ethyl iodide and alcohol. The residual yellow, syrupy liquid was then dissolved in warm water, filtered, and the filtrate, after saturating with sodium carbonate in excess, was shaken with ether. The ethereal solution obtained left upon evaporation a yellow crystalline mass, which was redissolved in dilute hydrochloric acid and the filtered solution repeatedly shaken with ether to remove colouring matter.

The decolorized acid watery solution upon evaporation left the alkaloid in white silky crystals, which by dissolving and recrystallizing from alcohol were obtained in larger monclinic prisms, similar to those of cocaine. Analysis of the platinum salt gave the formula $(C_{16}H_{18}(C_2H_5)NO_4.HCl)_2PtCl_4$.

Ladenburg has recommended for this substance the name "cocethyline," but according to analogy in this nomenclature the next highest homologue would be "cocpropyline," etc. I have preferred, therefore, to select a name which would better correspond to the chemical constitution of the body. As cocaine is the methyl ester of benzoylecgonine it can be described as "methylbenzoylecgonine;" the following homologues would then be named "ethylbenzoylecgonine," "propylbenzoylecgonine," etc.

The crystals of ethylbenzoylecgonine melt at 107° to 108° C., and solidify again at 90° C. It forms like cocaine readily crystallizable salts. The hydrochloride crystallizes in handsome colourless needles or prisms, freely soluble in water and alcohol, and insoluble in ether. It is also soluble in hydrochloric acid and in hot alcohol. Platinic chloride produces in its solutions a yellow precipitate of magnificent lustrous rhombic plates, soluble in hot water, but crystallizing out on cooling. Gold chloride gives a voluminous yellowish-white precipitate, which is soluble in warm water and alcohol, and also in hydrochloric acid. Phosphomolybdic acid gives a heavy yellow precipitate, Mayer's reagent a white precipitate, and picric acid a yellow, readily soluble precipitate. Bromine water gives a yellow precipitate, soluble in ammonia. Potassium iodide and sulphocyanide produce only a turbidity. Mercuric chloride gives a white precipitate, easily soluble in hot water. Zinc chloride gives a white precipitate. Sodium phosphate gives in concentrated solutions a white precipitate soluble in water and in acetic acid. Hydrobromic and hydriodic acids, ammonium oxalate, ferric chloride, and potassium chromate produce no precipitates. Alkalies and alkaline carbonates give white precipitates soluble in excess of the reagent.

The alkaloid possesses the same physiological properties as cocaine.

Monobrom-ethylbenzoylecgonine—

$(C_{16}H_{18}(C_2H_4Br)NO_4)$—

is obtained by heating benzoylecgonine with ethylene bromide and alcohol for five hours, at a temperature of 95° C., in a sealed tube. As in the case of the preceding preparation the liquid obtained was warmed to remove excess of ethylene bromide and alcohol, the syrupy residue dissolved in water, saturated with sodium carbonate in excesss and shaken with ether. The ethereal solution left upon evaporation a colourless syrup, which after several days showed no sign of crystallization.

The alkaloid, as well as its hydrochloride, has a bitter taste, and acts, like cocaine, anæsthetically. The hydrochloride forms a thick yellow syrup, which gives no crystallization. In the exsiccator, over sulphuric acid, it solidifies gradually to a vitreous amorphous mass, which is readily soluble in water and alcohol and insoluble in ether. Towards reagents it behaves essentially the same as ethylbenzoylecgonine.

Propylbenzoylecgonine ($C_{16}H_{18}(C_3H_7)NO_4$).—This compound is obtained by treating benzoylecgonine with propyl iodide and propyl alcohol in the same way as described for the previous preparations. The alkaloid crystallizes from the ether solution in colourless prisms or silky needles, and from alcohol in larger prisms. The crystals melt at 78° to 79·5° C., and solidify at about 65° C. The low melting point of this alkaloid, as well as that of the isobutyl derivative next described, is remarkable; but successive preparations of the compound showed a constant melting point. Benzoylecgonine contains four molecules of water, and melts at 90° to 92° C.; cocaine, the methyl derivative, melts at 98° C., and the ethyl derivative at 107° to 108° C.

Propylbenzoylecgonine has a very bitter taste, and a strongly anæsthetizing action. The hydrochloride is easily soluble in water and alcohol, insoluble in ether. Ordinarily it occurs as a syrupy liquid, but if kept in an exsiccator over sulphuric acid fine white crystals are formed. With reagents it behaves similarly to its homologues as before described. Sodium phosphate produces in its solutions a white precipitate, at first amorphous, but quickly passing into long colourless plates arranged in groups; these crystals are soluble in water and acetic acid.

Isobutylbenzoylecgonine ($C_{16}H_{18}(C_4H_9)NO_4$).—This compound is obtained by using isobutyl iodide and the corresponding alcohol as in the previous cases. The ether solution of the alkaloid upon evaporation leaves a colourless syrup, which quickly crystallizes. By recrystallization from alcohol it is obtained in short colourless prisms, which melt at 61° to 62° C.

* Read before the Chemical Section of the American Association for the Advancement of Science. From the *Pharmaceutische Rundschau*.

The alkaloid has an intensely bitter taste, and acts as a powerful anæsthetic.

The hydrochloride solidifies in the exsiccator over sulphuric acid to a hard vitreous yellowish mass, showing traces of crystallization. It gives with reagents the same reactions as cocaine and its ether homologues. Potassium iodide and sulphocyanide produce in concentrated solutions white precipitates.

PROTEIDS OF SEEDS OF ABRUS PRECATORIUS.*

BY SIDNEY MARTIN, M.D. LOND.

The proteids of the seeds of abrus, the Indian liquorice, are important physiologically, because they have been shown by Warden and Waddell† to be possessed of poisonous properties. To the poisonous product extracted by these observers the name "abrin" was given; and though it was decided that abrin was closely allied to "plant-albumin," yet no experiments were recorded to show whether the product was a mixture or a single proteid. They obtained it by making a watery extract of the crushed seeds and precipitating with alcohol, the precipitate being afterwards collected and dried.

Before proceeding to an examination of the physiological action of the jequirity, it seemed to me desirable to determine the kind of proteids present in the seeds, and the present communication embodies the results of the inquiries made with a view to such determination.

Method of Extraction of the Proteids.—The method used was based on the supposition that the proteids present in abrus were similar to those in other seeds, consisting chiefly of proteids of the globulin and albumose classes.

The finely ground seeds were shaken first of all with chloroform to remove the red cuticle which sinks in this liquid, so that the yellow kernel-powder could be readily removed, and obtained in the dry state by allowing the chloroform to evaporate.

The powder obtained was then extracted with 15 per cent. sodium chloride solution for twenty-four hours, and the mixture filtered. The yellowish filtrate was distinctly acid and gave a copious precipitate on boiling. The proteids were separated from this filtrate in two ways:—

(1.) Saturation with neutral ammonium sulphate and shaking for four hours throws down all the proteids in solution; the filtrate, after saturation, giving none of the proteid tests.

(2.) Saturation with sodium chloride and shaking for many hours gives only a scanty precipitate, which becomes copious on adding a large excess of glacial acetic acid. All the proteids are only with difficulty precipitated by this mode of saturation, even after prolonged shaking.

Since ammonium sulphate so readily throws down all the proteids in solution, the precipitate caused by it was used in the following manner in the examination of the proteids:—The precipitate was collected and dissolved by adding distilled water, and the solution dialysed in running water (with thymol) for five to seven days.

Dialysis caused a copious precipitate, which was collected and washed with distilled water (previously boiled to remove carbon dioxide) until no proteid in solution was present in the washings. The precipitate was then dried over sulphuric acid. The residue was in dark brown scales. It consisted of globulin with some colouring matter.

It is not possible to remove all the globulin by dialysis, so the liquid, after dialysing for seven days, was filtered into rectified spirit, which precipitated the remaining proteids. After standing under the alcohol six to eight weeks the globulin was coagulated, and the precipitate was collected, dried, and treated with distilled water, which dissolved out a proteid. This proteid is an albumose. The chloride of sodium method may be used instead of the ammonium sulphate; it takes a longer time, but gives products freer from colouring matter.

For chemical examination, the albumose is readily prepared by boiling and filtering an aqueous infusion of the seed. The globulin is coagulated while the albumose remains in solution.

Properties of the Globulin.—1. It is insoluble in distilled water, but readily soluble in 10 to 15 per cent. sodium chloride or magnesium sulphate solution; soluble to a less extent in 5 per cent. sodium chloride solution, and scarcely at all in 0·75 per cent.

2. It is completely precipitated from solution by saturation with sodium chloride after slightly acidifying, and with ammonium sulphate, whether the solution be neutral, acid, or alkaline.

3. It is coagulated by heat in 10 per cent. magnesium sulphate solution, between 75° and 80° C., the liquid being made distinctly acid; in 10 per cent. sodium chloride, between 66° and 73° C.

4. When the solution in 10 per cent. sodium chloride is placed in the incubator at 35° to 40° C., and allowed to remain twenty-four or even forty-eight hours, no precipitation occurs; a reaction in marked contrast to that given by some vegetable globulins. In its high coagulation temperature, and in its non-precipitation from solution by prolonged exposure to a moderate heat, abrus-globulin agrees with the proteid I have described in the juice of the fruit of *Carica papaya*, which, from its resemblance to serum-globulin, I have called vegetable paraglobulin.* The vegetable myosins occurring in the cereals, wheat, rye, and barley, have a lower coagulation temperature than the paraglobulins, viz., 50°—55° C., and are precipitated from solution and rendered insoluble by a prolonged exposure to a temperature of 35°—40° C.†

Properties of the Albumose.—1. Soluble in cold or boiling distilled water. Its chemical and physical properties are not apparently altered by boiling its solution.

2. It is not precipitated from solution by saturation with sodium chloride unless a large excess of glacial acetic or phosphoric acid be added. It is readily precipitated by saturation with neutral ammonium sulphate.

3. It does not form an albuminate.

4. Nitric acid does not precipitate it in a watery solution; but a precipitate falls if solid sodium chloride be added nearly to saturation.

5. Acetic acid causes a cloudiness, which is increased by potassium ferrocyanide.

6. Copper sulphate and basic acetate of lead cause precipitates, soluble in excess; mercuric chloride, a precipitate insoluble in excess.

7. Copper sulphate and potash give a pink coloration (biuret reaction).

For the albumoses occurring in the vegetable kingdom I have proposed the name *phytalbumoses*, as they differ in many respects from the animal varieties.

The phytalbumose in abrus is closely allied to Kühne and Chittenden's deutero-albumose,‡ and identical with the α-phytalbumose occurring in the papaw juice.§

There are, therefore, two proteids in the seeds of *Abrus precatorius*, a vegetable paraglobulin and α-phytalbumose. In conjunction with Dr. Wolfenden, I am now engaged in investigating the physiological action of each of these proteids, and hope soon to publish the results. For the present it will be sufficient to call to notice the close resemblance between the proteids of the papaw juice and those of jequirity, since their physiological action appears to be in many respects similar.

* From the 'Proceedings of the Royal Society,' May 5.

† 'The Non-bacillar Nature of Abrus Poison.' By C. J. H. Warden and L. A. Waddell. Calcutta, 1884.

* "Nature of Papaïn, etc.," *Journ. of Physiol.*, vol. vi. p. 353.

† 'Physiol Soc. Proc.,' February 12, 1887.

‡ Kühne and Chittenden, "Ueber Albumosen," *Zeitschr. für Biologie*, vol. xx.

§ "Nature of Papaïn, etc.," *Journ. of Physiol.*, vol. vi., p. 344.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 17, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE TESTING OF QUININE SULPHATE.

THE subject of quinine testing still continues to be discussed with considerable vigour, but not without evidence of a controversial spirit that might well be dispensed with. Some of the ephemeral fallacies that have been propagated during the past year or so in the guise of axiomatic principles for the guidance of pharmacists in regard to this subject have indeed been exploded and abandoned, and the price of quinine has been reduced to such a mere fraction of what it formerly was that adulteration is almost out of the question, and there should be no kind of difficulty in the nature of cost to prevent manufacturers from furnishing this article in a condition of reasonable purity for medicinal use. But though pharmacists are no longer in danger of being misled by exaggerated representations of the great impurity of commercial quinine sulphate, or by the *ignis fatuus* of "heavy quinine," and may safely trust to the purity of such a salt as they have long been accustomed to, there is still the difficulty as to the test by which a satisfactory degree of purity may be ascertained readily and with certainty. In this respect there are a host of competitors for recognition, and among the number it is not at all surprising to find that the ammonia test, introduced many years ago by Dr. KERNER, should still be advocated by its author as more thoroughly adapted to meet the requirements of a pharmaceutical test than any other. At the time when that test was introduced quinine sulphate often contained very considerable amounts of cinchonidine sulphate, or as it was then termed, quinidine. Probably the presence of this admixture was not altogether accidental in some instances, and if it was not the result of actual addition, it was provided for and secured by suitable arrangements of the manufacturing operations. Under such conditions the ammonia test, as originally devised, was very serviceable for distinguishing between pure and impure quinine sulphate, so far as those attributes could then be defined. The adoption of this test in the Pharmacopœa Germanica was but a natural recognition of its merit and fitness for practical purposes. But it was by no means a test by which absolute purity could be proved, and in course of time it also became evident not only that the indications furnished by this test left an appreciable margin for the presence of some unrecognized impurity in quinine sulphate, but also that there were defects in the prescribed mode of applying it which were of still greater importance so far as the comparison of different samples of the article was concerned.

In order to meet the objections to the ammonia test based upon these defects, Dr. KERNER has, in conjunction with Dr. WELLER, undertaken a long series of experiments with the view of improving the test and adapting it to existing requirements. In a brief notice of the first portion of their paper* it was mentioned that they looked upon the definition of purity as one that should be regulated in accordance with common sense considerations rather than with a pedantic chemical view of the case. In this respect they are in accord with the British Pharmacopœia, which admits of the presence of about 5 per cent. of sulphates of other cinchona alkaloids. What is required of a practical test is not that it shall give evidence of absolute purity, but that it shall be a safe guide as to uniformity of the article to be tested. But the chief defect of the ammonia test consisted in the fact that the preliminary treatment of a sample of quinine sulphate with cold water would not ensure the solution of the cinchonidine sulphate present; the greater part of it remained undissolved, and thus escaped recognition when the solution obtained was afterwards treated with ammonia. It is to this point chiefly that Drs. KERNER and WELLER have directed their attention in their endeavour to save the reputation of the ammonia test and justify its retention by the Pharmacopœa Germanica and other authorities. They ascribe this defect of the test to the existence of a double salt of quinine and cinchonidine, from which cinchonidine sulphate is not removed by cold water to anything like the same degree that it is by hot water. They mention that they have long been aware of the difference between the results obtained under these conditions, and that quinine sulphate containing several hundredths of cinchonidine salt would furnish results when tested by the official method apparently indicative of its purity, and therefore they did not receive altogether with discredit DE VRIJ's statements as to the presence of cinchonidine sulphate in commercial quinine, though, in common with most other quinine manufacturers, they considered those statements to be unfounded as regards the amount of cinchonidine, as indeed they have proved to be.

The principal feature of the improvements which Drs. KERNER and WELLER recommend in the carrying out of the ammonia test is in accordance with the recommendation of the French Commission, the use of warm water for dissolving the cinchonidine sulphate, which according to their view is "latent" by reason of its being combined with quinine sulphate, forming a double salt. They prefer this mode of operating to dissolving the quinine in boiling water, because they are of opinion that in the

* See *Pharm. Journ.*, February 26, 1887, page 686.

latter case a double salt would be formed on cooling the hot solution and the cinchonidine again rendered latent; but they do not suggest any reason why that should not also take place during the cooling of the warm water solution recommended by them. However, the views put forward by the authors are supported by experimental data, and, therefore, it would be inappropriate to raise any decided objection to them without further investigation.

From a syllabus that has been issued for the coming session of the School of Pharmacy in connection with the North of England Pharmaceutical Association, it would appear that the excellent arrangements of previous years are to be continued. In the lecture room of the Association, St. Nicholas Chambers, Newcastle-upon-Tyne, Mr. Proctor will deliver a course of ten lectures on Pharmacy, on Friday evenings, at six o'clock, from October to December; Mr. N. H. Martin will follow with a course of about thirty lectures on Materia Medica, on Friday evenings, in January to July, at the same hour; while on Friday evenings, at half-past seven, from the commencement of October to the end of July, Mr. Stuart will lecture on Botany. A course of lectures on Chemistry and the Physics of Chemistry, extending from October to July, will be delivered by Professor Bedson on Friday mornings at half-past ten, in the Lecture Theatre of the Durham College of Science, and there will be a Practical Chemistry class held on Friday afternoons in the Laboratory of the same institution. All inquiries should be addressed to the Honorary Librarian, Mr. A. Wright, 29, Mosley Street, Newcastle-upon-Tyne.

* * *

We have also much pleasure in calling attention to the syllabus of the third session of the Sheffield School of Pharmacy, which has just been issued. The work of the classes is to commence on Monday, October 10, and to continue until the end of April. The fee for attendance at each of the three lecture classes is 10*s.*, and for the class of Practical Chemistry it is 15*s.* The lectures on Chemistry will be delivered by Mr. Rhoden, those on Materia Medica by Mr. Humphrey, and those on Botany by Mr. Grierson. The class of Practical Chemistry will be under the direction of Mr. Morrison. In all cases the classes will be held in the evening, but arrangements can be made for admitting students to work in the Laboratory of the Sheffield Pharmaceutical and Chemical Society at stated hours on payment of an additional fee. The effort that is thus made to provide instruction for pharmaceutical apprentices in Sheffield and its immediate neighbourhood at such an extremely moderate cost is one that ought to be very largely taken advantage of, and those who have undertaken to carry out the work of teaching upon the terms stated will at least be entitled to grateful recognition of their desire to do what is possible in their own locality towards removing the deficiency of sound scientific education in connection with pharmacy.

* * *

Referring to the compound that has recently been introduced as an antipyretic under the trivial name "antifebrin," Messrs. Gehe, in the new number of their trade report, express the opinion that it is desirable that in medical circles only its scientific name, "acetanilid," should be used. It is pointed out that there are disadvantages attending the adoption of arbitrarily chosen designations, as the practice favours the registration of catch names for chemical compounds of known composition, thus establishing a practical monopoly in the sale of them.

* * *

An Act that has just been passed to regulate the practice of pharmacy and the sale of poisons in the State of Pennsylvania contains definitions of two classes of "poisons." In the first place it provides that any drug, chemical or preparation which, according to standard works on medicine or materia medica, is liable to be destructive to human life in quantities of sixty grains or less, shall be deemed to be a "poison" within the meaning of the Act. It further is made illegal for any person to supply any of such "poisons" without a label bearing the word "poison" and the name and address of the seller, or without satisfying himself that such poison is to be used for legitimate purposes. In the second place every sale of a "poison" known to be destructive to human life in quantities of five grains or less has to be registered, and the register must be kept for a period of at least two years, and during that time must be always accessible for inspection by the coroner or legal authorities.

* * *

Under the Pennsylvania Pharmacy Act, not only the dealing in "poisons," as defined in the previous paragraph, but the entire business of compounding or dispensing medicines, or retailing drugs, chemicals and medicines, is limited to registered persons, with the usual exception in favour of medical practitioners. With a reservation of existing rights, any person who may in future desire to carry on business as a pharmacist in the State will in order to secure registration have to produce evidence of four years' practical experience, and pass an examination, whilst to become registered as a qualified assistant will require evidence of two years' practical experience, and the passing of an examination. No unregistered person is to be allowed to dispense in a pharmacy, except under the immediate supervision of the proprietor or a qualified assistant.

* * *

We are now able to state that the tree from the leaves of which Dr. Claiborne recently reported that he had separated an anæsthetic basic substance, which he named "stenocarpine" (see before, p. 171), is not *Acacia stenocarpa*, as was supposed, but *Gleditschia triacanthos*, L. Specimens of the foliage have been sent to the Museum of the Pharmaceutical Society by Messrs. W. H. Schieffelin and Co., of New York, to whom they were sent by Mr. Nayler, of Jersey City.

* * *

We are requested to make known to those who were present at the Conference meeting in Manchester that the photograph taken at Matlock has turned out remarkably well, notwithstanding the adverse conditions under which it was taken. The group includes upwards of one hundred and ninety portraits, all of which are readily recognizable. Arrangements have been made with the photographer to forward copies to those who may desire to have this souvenir of the excursion, and Mr. Hart, of Manchester, will undertake to see that they are sent in due course to any one who forwards the amount of 3*s.* for an unmounted, or 3*s.* 6*d.* for a mounted copy, together with the cost of carriage. Early application is desirable for those who wish to obtain copies promptly.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 7th instant, at the Society's rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. William N. Allen, in the chair.

The other members of the Council present were the Vice-President, Mr. Draper; Mr. J. E. Brunker, M.A., Mr. Charles Evans, Dr. Montgomery, Mr. Grindley and Mr. Hayes.

The Registrar, Mr. Arthur T. Ferrall, read the minutes of the last meeting, which were confirmed.

Mr. Hayes said that before the business of the meeting commenced, he desired to propose a vote of condolence with Mr. Doran, one of the members of the Council, on the occasion of his recent bereavement. He had known Mr. Doran for thirty years, and had always had a high opinion of him; and he was sure that all the members of the Council would sympathize with him in his trouble. He moved—

"That this Council desire to convey to Mr. Doran their sincere regret and heartfelt sympathy in his sad affliction."

Mr. Grindley seconded the motion.

The Vice-President said he had the highest possible respect for Mr. Doran, and he was sure the motion expressed the feeling of every member present.

The motion was unanimously agreed to.

A letter was received from Mr. John Evans, L.A., thanking the Council for having elected him Examiner in Pharmacy.

A letter was received from Mr. John Bronte, L.P.S.I., dated Tory Street, Wellington, New Zealand, July 9, stating that the Pharmacy Board of New Zealand refused registration to Irish pharmaceutical chemists. The writer stated that he interviewed the Hon. P. Buckley, the Colonial Secretary, on the subject; and he promised his assistance, and had redeemed the promise by introducing a Bill into the Legislative Council to add the word "Ireland" to "Great Britain" in the clause of the existing Act under which pharmaceutical chemists of Great Britain were entitled to registry, but which had been held not to include Ireland.

Mr. Brunker: I think we ought to be very much obliged to this gentleman for fighting our battle as well as his own.

The Vice-President: He should be thanked for his letter and a copy of the Calendar sent to him.

Mr. Brunker: The New Zealand Board recognizes the licences of Victoria. Victoria recognizes us; so that if one of our licentiates pays a fee in Victoria he can obtain the licence of New Zealand in that way.

The Vice-President moved that Mr. Bronte be thanked for his letter and a copy of the Calendar forwarded to him.

Mr. Hayes: Have we shown reciprocity by admitting any of their members?

The President: We cannot; we have no power under our Act of Parliament to admit any strangers.

Dr. Montgomery: Do we not admit members of the English Society?

The President: No; we have not the power.

The motion was seconded and agreed to.

A letter was received from Sir William Kaye, Q.C., Clerk of the Privy Council, enclosing a copy of an order of the Privy Council approving of the appointment of Mr. John Evans as Examiner in Pharmacy.

Another letter from Sir William Kaye related to one of certain resolutions passed by the Council on April 6, 1887, and forwarded on the 18th of the same month to him for approval by the Lord Lieutenant and Privy Council. That resolution was as follows:—"That any candidate who presents himself for examination, and who shall receive an examination paper in due course from the examiner, shall be regarded as a rejected candidate if he does not attend the examination throughout." Sir W. Kaye's letter stated that he had been directed to inform the Council that it had been pointed out by the Law Officers of the Crown that the resolution might work hardly, as if a candidate got ill for a short time before finishing a paper, even though he had done all the others and his marks were sufficient, he would be classed as rejected.

The President said that as the resolution had been passed on the motion of Mr. Brunker, he would ask him if he had any observations to make on the letter.

Mr. Brunker said he thought the comment of the Privy Council was rather like straining at a gnat; however, he would willingly endeavour to meet its wishes. The resolution was passed to put a stop to young men running in to an examination and then when they found the papers too difficult for them running away again.

The Vice-President: And they might under such circumstances take the papers away with them.

Mr. Brunker said the case put by the Privy Council was that of a young man being taken ill at the close of an examination; and he thought the Council should meet it in a way that would satisfy them. He moved that the following words be added to the resolution:—

"Unless previous to retiring he shall have made the necessary number of marks to satisfy the examiners."

Dr. Evans seconded the motion, which was unanimously agreed to.

A letter from Mr. William Daly Moore, a licentiate of the Apothecaries' Society of London, stated that he had presented his diploma to the President, Mr. Allen, and requested to be placed on the Register of Irish Pharmaceutical Chemists.

The President said he had seen this gentleman's diploma, but he feared there was a legal difficulty in the way of complying with his request.

Dr. Montgomery: This gentleman applied to me also. In the Apothecaries' Hall of Ireland we admit members of the London Society of Apothecaries, and present them with our diploma on the payment by them of six guineas.

Mr. Brunker: The words of our Act are, "The term 'Licentiate of Apothecaries' Hall' shall mean a person who has a certificate to open shop or to follow the art and mystery of an apothecary under the provisions of the Act of 1791."

Mr. Hayes: I do not think we can comply with the request.

The President: He can only be registered indirectly.

Dr. Montgomery: Can we not get reciprocity with England in this matter?

The President: That is a large question. We have no means of reciprocity under our present Act.

Donations were received from the Smithsonian Institution of Washington of their Report for 1885, and from the Alumni Association, Philadelphia College of Pharmacy, of their twenty-third Annual Report.

On the motion of the Vice-President, seconded by Mr. Grindley, thanks were voted to the donors.

The following gentlemen were elected members of the Society:—Mr. Patrick Kelly, L.P.S.I., 43, Lennox Street, Dublin, proposed by the President, and seconded by Mr. Evans; Mr. James Archibald McKee, L.P.S.I., Rockfield, Portarlington, proposed by the President, and seconded by Mr. Wells; Mr. John Thompson, L.P.S.I., 25, Church Street, Coleraine, proposed by the President, and seconded by Mr. Brunker; and Mr. John Patrick Thomas Timmon, L.P.S.I., The Pharmacy, Belturbet, proposed by the President, and seconded by Mr. Wells.

Some financial business having been disposed of, the Council adjourned.

British Pharmaceutical Conference.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held at the Grand Hotel, Manchester, on Monday, August 29, at 10 p.m.

Present—Mr. Atkins, President, in the chair; Messrs. Benger, Brady, Brunker, Conroy, Davies, Dott, Elborne, Gerrard, Maben, Reynolds, Schacht, Symes, Symons, Williams, and Woolley, Dr. Thresh and Mr. W. A. H. Naylor, Hon. Gen. Secs., and W. H. Ince, Assist. Sec.

The minutes of the previous meeting were read and confirmed.

A draft report, for presentation at the annual meeting, was submitted by the Hon. Gen. Secs., and after a slight alteration, was agreed to.

The order in which papers should be read at the general meeting was discussed, and the programme arranged.

The Treasurer's financial statement for the year 1886–7 was read and approved.

A proposed list of officers for the ensuing year was discussed and adopted for recommendation to the general meeting for election.

The MS. of the 'Year-Book' for 1887, so far as it could be completed, was laid on the table.

The place of meeting for 1888 was considered. The Committee was of opinion that the Conference should adhere to its usual custom in following the British Association and go to Bath.

A report of the Formulary Committee was presented through its Chairman and read by Mr. Naylor.

The report was accepted, and it was agreed to recommend to the general meeting the reappointment of the Committee.

A letter was then read from Messrs. Dott and Stockman, requesting a grant of £5 for the purchase of materials to carry out an investigation on morphine derivatives.

Proposed by Mr. Naylor, seconded by Mr. Conroy, and carried unanimously that the grant be accorded.

Mr. J. C. Nightingale was elected Assistant Secretary in the room of Mr. W. H. Ince, who found it impracticable longer to fulfil the duties of this office.

It was announced that Mr. Ryder Horton had resigned the office of Honorary Secretary for New South Wales, and that steps had been taken for appointing a suitable successor.

Sixty gentlemen were duly nominated and elected to membership.

At a meeting of the Executive Committee held on Thursday, September 1, it was agreed to offer for sale, through Messrs. J. and A. Churchill, the British Pharmaceutical Conference Unofficial Formulary, at a cost of 6*d.* per copy in paper covers, and 1*s.* per copy bound in cloth. It was further agreed that the 1*s.* copies should be interleaved.

GENERAL MEETING AT MANCHESTER.

Reading of Papers.

Tuesday, August 30.

(*Continued from p.* 224.)

The next paper read was on—

A New Process for the Preparation of Aconitine.

BY JOHN WILLIAMS, F.C.S., F.I.C.

At the meeting of the British Pharmaceutical Conference held last year in Birmingham, I read a short note upon the best mode of preparing crystallized aconitine, and gave the process generally adopted, and by which it can be made without much difficulty.

During the past year I have continued my experiments upon this matter, and have succeeded in preparing the alkaloid by a process which yields, I think, better results than the one I laid before the Conference on the last occasion, and which, as far as I can discover, is new and has not yet been described. I have now great pleasure in being permitted to bring it before this meeting.

The new process for the preparation of aconitine is very simple in outline, but some practical details must be attended to if a successful result is to be obtained. The process is as follows:—

Aconite root (the root of the *Aconitum Napellus*), dried at a very moderate temperature and coarsely ground, is thoroughly exhausted with amyl alcohol (fusel oil); the amylic solution so obtained is shaken with dilute acid and water, this acid liquid precipitated with carbonate of soda, and the rough alkaloid produced, dissolved either in ether or alcohol and allowed to crystallize, when the pure alkaloid is obtained.

To carry out this process, however, so as to obtain a satisfactory result, I find several precautions must be taken. The first difficulty is with regard to the aconite root, which should be carefully chosen, and if possible the root verified botanically as that of the *A. Napellus*. We have now every reason to believe that other species of aconite, although yielding alkaloids, some of them probably of great medicinal importance, do not yield alkaloids identical with that obtained from the *A. Napellus*, and as the British Pharmacopœia (very properly I think) gives that plant as the officinal one, great care should of course be taken to avoid the admixture of other varieties. The matter is one of great difficulty, but so important is it considered that, as most of you are doubtless aware, a small sum of money has been granted from the funds of this Conference to enable Mr. Holmes to, if possible, grow some napellus roots, about the species of which there can be no doubt, and in this way it is hoped we may arrive at more certain conclusions than have hitherto been possible; and I trust we shall be able to establish beyond doubt the real nature of the alkaloid contained in the *A. Napellus*. Of course the experiments I am about to detail have been made upon a sample of root which I believe to be napellus, but it is impossible for me to say so with certainty.

The fusel oil used should be of fairly good quality, and free from ordinary spirit. This oil as sent out by distillers frequently contains a considerable quantity of ordinary spirit; if this is found to be the case it should be carefully got rid of by washing the oil with water several times, and, if the sample is a very bad one, distilling it in a current of steam.

For extracting the root I find maceration for a few days with frequent stirring, and then percolation, the most effective. I do not advise the use of any acid, such as tartaric, and have come to the conclusion that such addition is quite unnecessary. I also think that the maceration and percolation should be done in the cold. I think heating the materials, however gently, very undesirable and, indeed, injurious; in fact, I think heat should be avoided as far as possible throughout the whole process.

The fusel oil after percolation is of a pale straw colour, and is not contaminated with the dark oleoresin, which is extracted from the root by ordinary alcohol; this, I need hardly remark, is a very great advantage.

In washing out the alkaloid from the fusel oil by weak acid and water, I prefer sulphuric acid (about 1 fluid drachm to, say, 4 pints of water). The oil should be shaken with small but successive portions of the dilute acid, and the aqueous liquid tested with litmus paper, so as to be quite certain that the acid is in excess. I prefer the use of sulphuric acid for this purpose to such acids as the hydrochloric or tartaric. The sulphate of aconitine appears to be less soluble in fusel oil than the hydrochlorate or the tartrate, and, therefore, is more readily extracted. It frequently happens that some hours are necessary for the complete separation of the

liquors from the oily liquid, but the time may frequently be much shortened by slight agitation in a rotary direction. The completion of the washing is known when the aqueous liquid no longer gives any, or only a slight, precipitate with such reagents as double iodide of mercury and potassium, etc.; if this is not attended to, considerable loss may occur.

The weak acid liquid separated from the fusel oil smells strongly of that body, which is to a slight extent soluble in water. To get rid of this, the liquid must be shaken with ether (common methylated ether, from which the spirit has been washed out, answers the purpose perfectly). Generally, the treatment with the ether should be repeated, as I do not find it easy to separate the whole of the fusel oil at the first operation, unless a very large excess of ether is employed.

The aqueous liquid so obtained smells very strongly of ether, the liquid should therefore, be placed in a shallow basin and left in a water-bath, very gently heated, for a few hours. When cold it will be found to be free from both odour and colour, and in a fit state for precipitation.

The precipitation of the crude alkaloid is, I think, best effected by a strong solution of ordinary carbonate of soda. Ammonia can be used, but I decidedly prefer the soda, as I have obtained better crystals from the soda precipitate than from the ammonia one.

The precipitate of crude alkaloid, which is nearly white, should be slightly washed and dried, but some care is necessary in drying it, for we must bear in mind that the alkaloid we are dealing with is a most irritating and poisonous one when dry. If the aconitine is filtered on calico the precipitate can be squeezed and partly dried between porous tiles or other absorbent material, then before it is quite dry it can be distributed on blotting paper and exposed to the air. When dry it can be transferred to a flask or other vessel without difficulty.

The aconitine has now to be dissolved out from this mass by either ether or alcohol, and this must, I think, be done at a boiling temperature, this being the only part of the process in which heat is employed.

If ether is used it should be pure, washed from spirit and rendered anhydrous by some desiccating body. I prefer dried carbonate of potash.

The alkaloid is not very soluble in pure dry ether, and the boiling has to be kept up for some time before the ether is really saturated; it is then filtered into a basin, yielding a perfectly colourless solution, and allowed to evaporate spontaneously, when nearly the whole of the alkaloid is deposited in the crystallized state. The ether may be allowed to evaporate to dryness, and although the crystals deposited are very small, they give when examined by the microscope uniformly shaped crystals to the end. It frequently happens, however, that a ring of gummy extractive matter (almost colourless) forms around the upper rim of the crystals, due, I suppose, to oxidation, which, even under the most favourable conditions, cannot be entirely prevented. I have found it necessary to add to the dry crystals in the basin a few drachms of pure cold ether. The gummy matter I have alluded to is very soluble in ether, but the crystallized aconitine is not, or rather requires a long time before it dissolves. In this way the crystals can be washed from the gummy matter, which would otherwise contaminate them, and while still damp can be easily transferred to blotting paper, on which they can be allowed to dry spontaneously. It is true the crystals suffer a little, the sharpness of the edges being somewhat interfered with, but as the contact with the ether need be only for a minute or so the amount of injury done is very small, and the loss in weight is found not to be of much importance practically. Before I adopted this plan I found considerable difficulty in transferring the crystallized alkaloid from the basin to a bottle, and when we consider that the $\frac{1}{3000}$ grain has been found sufficient to kill a mouse, and that probably $\frac{1}{10000}$ grain is sufficient to produce very unpleasant symptoms on man, it can easily be seen that the plan of damping the crystals before removing them is a very necessary precaution. Of course a saturated solution of aconitine in ether might be used, but I think the washing the crystals with a little fresh ether is probably the best thing to do.

Crystallizing the aconitine from alcohol has some great advantages, but counterbalanced by some disadvantages.

I have hitherto used pure absolute alcohol. It is very possible that spirit of a lower strength might answer as well or even better, but I have not tried it. The alkaloid is far more soluble in alcohol than in ether, and on cooling a hot saturated solution crystals are deposited very readily. I have obtained some of quite a quarter of an inch in length, and all the crystals produced are much better defined than those deposited from ether; but unfortunately they are not white, colour begins to show itself very soon after solution, and during the after-evaporation of the alcohol the colour becomes deeper and deeper, thus proving that the alkaloid is much more easily altered (or oxidized) when in an alcoholic solution than when it is held in solution in ether or amyl alcohol. This fact is also of importance as helping to explain how it is that discrepant results were frequently obtained by the old process of working, in which alcohol (generally methylated) was used; it may prove, as I have often suspected, that some of the alkaloids which have from time to time been isolated by various chemists who have worked upon the subject, are really changed or altered conditions of the alkaloid, and do not represent any alkaloid really existing in the living plant. My effort has been to obtain the alkaloid in its unaltered condition,—that is, in the state in which it exists in the plant,—and this I think, by the process I have now described, and especially when ether is used as the solvent, is very nearly if not quite accomplished.

In my paper read before you at your last meeting, I pointed out reasons for dissenting from the proposal made by Mr. Mandelin to convert the crude aconitine into nitrate, and from such nitrate to prepare the alkaloid. I then pointed out that the alkaloid so produced generally acquired a yellow colour, and that the crystals when examined by the microscope differed distinctly from crystals obtained by a direct method, and the result of my present experiments quite confirms this opinion, that is as far as microscopic or chemical reactions can give evidence. I regret to say I am still without direct physiological evidence as to the medicinal activity of aconitine made by the process I have described, as contrasted with samples of the alkaloid made by other processes. I still hope that this subject will form a matter of research by one of our most eminent experimentalists, who has promised to take this matter up when he can spare the necessary time.

I ought to mention that aconitine can be crystallized from very weak spirit, say 1 part of strong alcohol to 2 of water. When such a hot solution, saturated with aconitine, is allowed to cool, long silky needles are deposited; they prove to be a hydrate of the alkaloid. The amorphous aconitine of the Pharmacopœia can also be readily prepared from the pure crystallized alkaloid by dissolving in water by means of dilute sulphuric acid and precipitating by ammonia, washing and drying on blotting paper. This precipitate is really a hydrate, and is soluble in pure anhydrous ether, when it deposits a small quantity of aqueous liquid by standing.

There is some reason to suspect that the medicinal activity of the alkaloid in the amorphous state is liable to vary, and as uniformity is most essential in this as in all potent drugs and chemicals, I think it would be better if in future editions of the Pharmacopœia the alkaloid in its crystallized state should be authorized in place of the amorphous now recognized as officinal.

I have commenced an investigation respecting some of the salts of this alkaloid, but unfortunately my health has

been such that I have not been able to continue my experiments, but I hope to be able to do so shortly. The careful analysis of the different products I have obtained has not yet been undertaken, but I hope that this also may be ready for publication shortly. In the meantime I ought to apologize for the imperfect manner in which I have ventured to bring this matter before you.

Before concluding I should like to say that I have tried this process upon a sample of what I have every reason to suppose was the root of the *Aconitum ferox*, but of whose identity I cannot be quite certain.

The alkaloid was yielded in good quantity, and very white, and appeared to be very much more soluble both in ether and alcohol than the aconitine yielded by the *A. Napellus*. I also found it most difficult, in fact I may say impossible, to crystallize it. But I may add that our friend Mr. Groves, of Weymouth, to whom I sent some of the sample, has been more fortunate, for he was able to show me a few weeks ago a slide which under the microscope proved to be studded with crystals, and as far as I could observe appeared to be of the right and well-known shape of the true alkaloid, so that there can be no doubt that the alkaloid from the *A. ferox* contains a crystallizable body, but I suspect is mixed with or masked by some other alkaloidal body, probably not so powerful in its toxic action as the true alkaloid. I came to the conclusion that the resulting product from ferox was not of a very active nature, when making it, as judging by the symptoms produced upon myself its power appeared to be far less than that prepared from napellus. This surprised me, as I had been under the impression that the alkaloid of the *A. ferox* was a very powerful one. As, however, some doubt exists as to the true nature of the root employed it is perhaps hardly necessary to consider this question further at present.

The principle of the process I have described in this paper may, I think, be applicable to the extraction of alkaloids from other plants. I have made some experiments which appear to support this view, but at present I have not been able to do much in carrying out this idea. Should I succeed in my experiments, however, I shall be happy to lay the results I may obtain, if of sufficient importance, before a future meeting of the Conference.

The PRESIDENT, in proposing a vote of thanks to Mr. Williams, said the members of the Conference would all join with him in regretting the cause which had prevented this investigation being completed, but if Mr. Williams had experimented on his own body with aconitine it was not surprising that he was not in very good form, and he would advise him in future to experiment on somebody else. He should be delighted when the investigation of aconitine was completed, for the literature upon it seemed to be inexhaustible.

Mr. HOLMES said that for a long time the knowledge of aconitine had been very unsatisfactory, but now, at all events, a crystalline aconitine could be placed in the hands of medical men for experiment. He should like to ask Mr. Williams whether the aconite root used by him was German aconite, or whether it had been cultivated in this country, and if the latter was the case, at what time of the year the root had been collected. They knew from the price paid for the German root, that it could only be collected by peasants or children in a very rough way, when there was no other work to do, and it was not possible to get a German root of good quality in commerce. The character of the root itself showed that it was by no means reliable as to species or quality. Unfortunately, in the British Pharmacopœia the root was ordered to be gathered at a time when its collection was almost impossible, *i.e.*, before the leaves appeared, for unless the collector had actually cultivated it, and knew where to find it before the leaves appeared, it was difficult to see how the root was to be obtained. If it were collected when the flowers appeared there would be some chance of knowing what species the plant belonged to. Another question he wished to ask Mr. Williams was whether he had found any traces of picraconitine or pseudaconitine in the roots he had examined, because if, as he supposed, they were the *A. Napellus* of commerce, those two alkaloids were stated in text-books on materia medica to have been found in that root.

Mr. CONROY said the Conference was highly indebted to Mr. Williams for this paper, one of the most practical he had heard at any of the meetings, and it was so complete and full that it defied criticism. He would ask whether Mr. Williams could state the percentage of alkaloids obtained, as it would be useful to have some information as to the probable yield.

Mr. BEAUFORT (Leicester) said he understood Mr. Williams to state that this process was applicable to the extraction of alkaloids generally, but if that were the case how could one be certain that aconitine alone had been isolated, as it was known that the root of *A. ferox* contained also pseudaconitine and similar bodies?

Mr. LONG remarked that these questions were of immense importance, but the question was when these products came to be used in small pharmacies in different parts of the country, how were pharmacists to know whether the material was absolutely pure, as it was so extremely dangerous to handle? They might be poisoned themselves in preparing the remedy which was to cure the patient.

Mr. WILLIAMS, in reply, said he was not certain about the origin of the root. He was obliged to buy aconite root in the market, and although he obtained the best he could, he could not trace its origin, and that was why he was looking forward with so much interest to what Mr. Holmes was cultivating for the Conference. When Mr. Holmes could spare a few pounds of the root, he should be very glad to work upon it, as he would then have the satisfaction of knowing he was dealing with a really definite thing. With regard to the pseudaconitine, and other alkaloidal substances which had been found by previous investigators, he had failed in finding them. The process, especially when ether was used, and that was the one he should recommend in practice, appeared to yield one alkaloid to the end, except the little ring, of which he had spoken, of the gummy amorphous alkaloidal body, which was soluble in acids and precipitated by alkalies, and was very small in quantity in comparison with the crystallized alkaloid. He could not state the exact percentage of aconitine yielded, because so much was wasted in experiments that it would be only a guess to state a percentage, but he was quite certain that he had obtained a much larger quantity by this process than he usually did by the old process. The reason was evident: the alkaloid was not destroyed and decomposed by the influence of heat upon an alcohol solution, and it was also kept free from the oleoresinous body which was always dissolved out by alcohol and from which there was much difficulty in separating the alkaloid. By the present process this substance was not dissolved from the root. Mr. Beaufort had rather misunderstood him. He did not say this process was adaptable for the general extraction of alkaloids, and he should not expect it would answer, for instance, for extracting morphia, but he believed it might answer very well for extracting such alkaloids as quinine. All alkaloids soluble in ether would probably work in amyl alcohol very easily, but bodies insoluble in ether, such as morphia and bodies of that class, he should hardly expect to yield good results. Mr. Long had spoken about testing the purity of aconitine, and he thought the best test would be to have a crystalline article, because the appearance and size of the crystals would be a guide, and microscopic examination of the crystals could easily be made by anyone. As for its strength, the effort of the Conference and of all pharmacists was to get alkaloids as pure as possible, and medical men, when they had the pure alkaloid, could always reduce the dose. If they had

an alkaloid of uncertain strength they did not know whether to increase or reduce it. The standard to be striven for was absolute purity.

THE REPORT OF THE FORMULARY COMMITTEE.

Mr. ROBINSON asked if the report of the Formulary Committee was to be accepted or discussed, as it did not appear on the agenda.

The PRESIDENT said it had been accepted in fact by accepting the report of the Committee.

The following paper was then read by Dr. THRESH :—

NOTE ON THE ESTIMATION OF IPECACUANHA.

BY FRANCIS RANSOM.

In an article on the "Assay of Ipecacuanha," by Professor Flückiger (*Pharm. Zeit.*, Jan. 13, 1886), the author states that 10 to 20 grms. of finely powdered root may be completely exhausted with boiling chloroform to which 1 c.c. of solution of ammonia (specific gravity ·92) has been added. He further states that the residue left from the distillation of the percolate when dried at 100° C. consists of practically pure emetine, and that the process is thus available as a method of estimation. From large experience he concludes that the root contains, on an average, not more than 1 per cent. of emetine, and that the much higher results recorded by other investigators are due to the impurity of the alkaloidal residue or to faults in titration.

I have myself obtained a considerably higher percentage than that mentioned, and while in 1876 Stewart recorded 1·84 per cent. as the average of eight samples (varying from 1·45 to 2·1), Lyons, in his recently published 'Manual of Pharmaceutical Assaying,' remarks that the proportion of alkaloid is large, generally amounting to more than 2 per cent. As Flückiger's process would seem to be the simplest and most direct of any method hitherto published, I have made some investigations to ascertain whether it is sufficiently reliable to be recommended.

Instead of percolating with chloroform with aqueous solution of ammonia added, it was found better to render the chloroform alkaline by agitation with strong solution of ammonia in a separator, and percolating with the separated chloroform, as any water present would undoubtedly extract other material than alkaloid.

Twenty grms. of ipecacuanha in 60 powder were packed closely in the percolator of a Dunstan and Short extraction apparatus, and the alkaline solvent passed slowly through in the cold. By this means the emetine is liberated from its combined acid and the exhaustion can be completed by continuing the percolation with the boiling chloroform, about five columns being necessary for this purpose. The termination of the extraction is indicated by evaporating to dryness a few drops of the chloroform that fall from the percolator, dissolving the residue in diluted sulphuric acid and adding a drop of Mayer's reagent (solution of iodohydrargyrate of potassium), when any alkaloid present would be made apparent by cloudiness. That no alkaloid remains in the marc after this treatment was further demonstrated in a similar experiment by digesting the residual root with lime and diluted alcohol, filtering, evaporating and examining the residue by the same method, no precipitate being produced. The chloroformic percolate was then divided into two equal parts, *A* and *B*, and examined as follows :—

A. This was evaporated to dryness at a temperature of 100° C. The residue thus obtained was amorphous, and of a yellowish-brown colour, and weighed ·379 grm. As half the original percolate represented 10 grms. of root, this would give a percentage of 3·79. It had, however, no appearance of pure alkaloid, and on warming gently with very dilute sulphuric acid, it was found to be only partially soluble, the remainder being of a dark resinoid appearance. The filtered acid solution was rendered alkaline with ammonia, and the alkaloid extracted with chloroform. This, on evaporation, left a residue weighing ·197 grm., indicating 1·97 per cent. in the root, or about half that shown in the first instance. As even this final residue had not the appearance of pure emetine, it was treated with dilute sulphuric acid, in which it was almost entirely soluble, and estimated volumetrically with Mayer's reagent, of which 1 c.c. is regarded as equivalent to ·0189 grm. emetine. To complete the precipitation it was found necessary to add a volume of the reagent equivalent to ·16 grm. alkaloid, indicating a percentage of 1·6 in the root.

The remaining portion, *B*, of the original percolate was then agitated with two successive portions of dilute sulphuric acid and the acid solution estimated with Mayer's reagent, which indicated the presence of ·18 grm. emetine, *i.e.*, a percentage of 1·8 in the root, which I think we may safely take as being approximately correct.

From these results it appears that ammoniated chloroform may be advantageously employed for the exhaustion of the root, but that in addition to the alkaloid foreign matter is also extracted, which must be removed before the emetine can be gravimetrically determined. It is also shown that a portion of the emetine was lost in the process before the estimation of the second residue from *A*. This loss is probably due to the continued application of the heat employed to remove the last traces of moisture, as it is well known that the alkaloid is liable to decomposition at a high temperature. The most ready mode of estimation would therefore appear to consist in simply removing the alkaloid with acid from the chloroformic percolate, and estimating this solution volumetrically with Mayer's reagent. That the volume of liquid affects the results with this precipitant has been shown by several observers, and a convenient table of necessary corrections, based on experiments on a specimen of pure hydrochlorate of emetine, was included in a paper by H. W. Jones, read at the meeting of this Conference at Birmingham last year. The strength of the sulphuric acid used in my experiments has been about 2 per cent., and I have not found that slight variations have caused any difference in the final results.

Having some fear lest the continuous contact with the strongly alkaline chloroform might decompose a portion of the alkaloid, I made two estimations of a sample of ipecacuanha, in one of which the root and alkaline solvent were left in contact for four weeks, while in the other the entire estimation was completed in the course of a few hours. The difference in the quantity of alkaloid found amounted only to ·02 per cent., a variation probably due to experimental error only.

That a thoroughly reliable gravimetric process would be preferable to any volumetric method when great accuracy is required is beyond question; but for ordinary work, where approximately correct results are sufficient, and when the comparative value of various samples is the principal object of investigation, it would appear that exhaustion of the drug, as described, with ammoniated chloroform, removal of the alkaloid with dilute sulphuric acid and estimation of this solution with Mayer's reagent may be regarded as a safe and useful method of assay.

Proceeding as described, I have estimated the value of the following samples of root.

		Percentage of emetine.
1.	contained	1·9
2.	,,	2·3
3.	,,	1·3
4.	,,	1·6
5.	,,	1·7
6.	,,	1·7
7.	,,	1·5
8.	,,	1·3
9.	,,	1·5
10.	,,	1·8

In the above specimens the proportion of emetine pre-

sent varies from 1·3 to 2·3 per cent., the average strength being 1·66.

It was generally found, as anticipated, that the roots containing the largest amount of cortical portion were richest in alkaloid. This was not, however, invariably the case, one or two specimens of fine appearance being below the average. This may be due to deterioration of the root by keeping, or it may have suffered from damp during transit from Brazil. Mr. Holmes, who kindly provided several of the above specimens, has suggested that in some cases the mouldy roots have been washed and dried on arrival here, and thus made presentable for the market. Some of the specimens yielding the highest percentage of alkaloid are believed to be of the most recent importation.

An exhaustive paper on "Ipecacuanha" has recently been published by Kunz (*Archiv der Pharmacie*, June 15, 1887), in which the author attributes to emetine the formula $C_{30}H_{40}N_2O_5$, which differs from those previously published. The preparation of the alkaloid in a condition of absolute purity has hitherto been attended with great difficulty, and it is probable that some slight modification of Dragendorff's stated equivalent of Mayer's reagent (1 c.c. = ·0189 grm.) will be required as soon as the correct formula for the alkaloid is fully determined and admitted. The presence of choline in ipecacuanha has also been detected by this author, a fact which must be taken into consideration in all methods of assay. Choline has also been discovered in Indian hemp and hops, and Professor Dunstan has recently found it in the alcoholic extract of belladonna. Whether this base exists naturally in the living plants or is occasionally a product of decomposition remains to be determined, but being soluble in dilute acid and precipitated by the ordinary alkaloidal reagents it is liable to become a source of error if its presence be ignored.

The PRESIDENT moved a vote of thanks to Mr. Ransom for this practical and useful paper.

Mr. NAYLOR said he saw others present who, like himself, had worked on the subject of the determination of emetine in ipecacuanha, but he had never yet been satisfied with any process he had worked, because he had never yet been able to get a uniform result. Various processes had always yielded a very varying product, and he did not see how this was to be got over until the composition of emetine was definitely settled, and its constitution known. For some time it was difficult to obtain emetine in other than an amorphous form, but in more recent years it had been obtained in a crystalline condition, the formula of which had been determined, but beyond that point no one appeared to have gone. He thought there was considerable value in this paper, but was a little surprised to find that the author had obtained such very high results in estimating the alkaloid of ipecacuanha. He had never obtained results approaching those now presented by Mr. Ransom. It would, therefore, appear that this process of Professor Flückiger's was either capable of extracting a much larger amount of emetine from ipecacuanha, or that along with the alkaloid there was some foreign substance. He could corroborate the testimony of Mr. Ransom that it would be very much better to rely on some good gravimetric method rather than on the volumetric method of Mayer, which was described last year in the excellent paper of Mr. Jones. He had had some experience with it, and believed that under certain conditions, it was fairly accurate. Still, from his own experience, he should certainly give the preference to some gravimetric method. He was rather inclined himself to continue the use of lime, which he had no reason to think acted injuriously on the emetine; in fact, it was by such a process that the crystalline emetine had been extracted.

The next paper read was on—

MACKAY BEAN, THE SEED OF ENTADA SCANDENS.

BY JOHN MOSS, F.I.C., F.C.S.

A year ago (Sept., 1886), during a visit to the Colonial and Indian Exhibition, a prominent Victorian happened to mention a curious seed known as the Mackay bean, and made the statement that it was strongly poisonous. Curiosity being excited we shortly found the bean in the Court appropriated to Queensland, of which colony it is a product. I am indebted to Mr. Holmes for the information that it is the seed of *Entada scandens*, N.O. Leguminosæ. Through the kindness and courtesy of Sir James Service, Agent-General to the Colony, a moiety of the beans which a too acquisitive public still left at his disposal was sent to me. A specimen of them lies on the table. The lomentum received was 13 inches long and had one or more cells broken from the style end. The cells are well marked, ligneous, red-brown in colour, and easily separable, being held in position by permanent sutures on each margin; they are from 3 to $3\frac{1}{2}$ inches long and 3 inches wide including the sutures. From each suture on both sides are obvious transverse striæ which are lost about three-quarters of an inch from the margin.

The sides of the divisions are also easily separable from each other, and between them is enclosed a single smooth shining seed of a dark chestnut-brown colour, covered as to the centre by a cinnamon-brown powder which has been rubbed from the inner surface of the cell. The latter is marked by evident radial furrows extending half an inch from the margin. The seeds are lenticular and nearly round, $1\frac{5}{8}$ths by $1\frac{7}{8}$ths of an inch in diameter, and $\frac{15}{16}$ths of an inch thick; the hilum is very small, but well marked, and is on one of the longer sides. The seed can be sawn through so as to make a clean cut and expose two hard pale cream-coloured cotyledons enclosing a lenticular cavity. The integument is sufficiently firm to permit of being converted into very attractive pocket vesta cases. A seed weighs 330 grains, of which 150 grains are integuments and 180 grains contents.

In order to isolate the principle to which the alleged poisonous properties of the Mackay bean are due, the legumin and integuments were treated separately.

Legumin.

Ether Extract.—571 grains in powder on being exhausted by percolation with ether (·720) yielded 40·14 grains, 7·03 per cent., of a neutral turbid pale yellow viscid oil which was not rendered clear by heat.

Spirituous Extract.—The same powder freed from ether by exposure yielded to spirit of wine (·838) 26·28 grains, 4·6 per cent., of reddish gummy hygroscopic extractive.

Chloroform Extract.—The same powder yielded to chloroform 2·48 grains, ·435 per cent., of pale yellow hygroscopic extract of a greasy consistency.

Proof Spirit Extract.—Proof spirit removed 257·56 grains, 45·1 per cent., of a brown translucent semi-horny extract, which could not be obtained quite dry at 212° F.

By macerating the dried residue with rectified spirit (·838) for three days in a warm place, 2 grains, ·35 per cent., more extract were obtained.

The Ether, *Strong Spirit* and *Chloroform* extracts were separately treated with dilute hydrochloric acid and Mayer's reagent applied to the clear filtrate. The proof spirit extract was treated with subacetate of lead, filtered, sulphuretted hydrogen passed through the filtrate, again filtered, slightly acidulated with hydrochloric acid and Mayer's reagent applied to the clear filtrate. In no instance was any indication of an alkaloid obtained. None of the above extracts reduce the copper in Fehling's solution, either before or after boiling with dilute sulphuric acid.

The legumin of Mackay bean therefore, does not yield anything to the solvents named, either alkaloidal or glucosidal in its nature.

Integuments.

Ether Extract.—411 grains in powder on being exhausted by percolation with ether (·720) yielded ·68 grain, ·165 per cent., of a yellow film which became plum coloured on drying at 212° F.

Spirituous Extract.—The same powder yielded to spirit of wine (·838) 1·02 grain, ·248 per cent., of brown extractive.

Chloroform.—This removed ·28 grain, ·068 per cent., of green extract.

Proof Spirit.—Removed 15·05 grains, 3 66 per cent., of a red-brown brittle extract.

Water.—Removed 24·77 grains, 6 per cent., of deep brown extract.

All the above extracts after suitable treatment are indifferent to Mayer's reagent; the integuments, therefore, of Mackay bean are, like the legumin, quite innocent of alkaloid.

The proof spirit extract of integuments reduced Fehling's solution both before and after boiling with dilute sulphuric acid, but more freely after boiling. The water extract was so obviously of the same character as the above that the two were treated as the same. The aqueous solution is precipitated by sulphuric acid. The washed precipitate on being dissolved in hot nitric acid gives no evidence of a sulphate. It is insoluble in hydrochloric acid, chloroform, ether, benzol and spirit of wine ·838. It is partly dissolved by soda, giving a yellow-red solution which is not precipitated by an excess of acid. The solution in nitric acid is not precipitated by excess of alkali. When strongly heated the aqueous extract ignites and leaves a little ash. Its solution in water froths freely when shaken. It is of a bright red colour, which is not imparted to either chloroform, ether, benzol, amylic alcohol, bisulphide of carbon, or turpentine. The colour is discharged by hydrochloric acid, and restored by ammonia.

The above observations point to the conclusion that the aqueous extract contains *saponin*, but no one who has worked on this body will be surprised that up to the present some difficulty has been experienced in separating it so as to establish absolute identity. With more material this can no doubt be readily accomplished. Saponin is only poisonous in a modified degree, not to an extent which justifies the terms in which the bean was originally described. Indeed, I have learned that the bean is to some extent used as an article of food. By very slow spontaneous evaporation of the aqueous solution, extending over some months, I have succeeded in obtaining three or four microscopic crystals, which appear strikingly brilliant amid their turbid surroundings, are tetrahedral in form, and altogether weigh something less than one-twentieth of a grain. When the crop is large enough, I hope to make a particular examination of these.

The PRESIDENT, in proposing a vote of thanks to Mr. Moss, said it had been remarked at the time of the Colonial Exhibition, that no doubt it would furnish a large amount of material for investigation, and this was illustrated by the present paper. He was given to understand that there were many workers at the present time engaged on other colonial products, although their work was not yet in a sufficiently forward state to be presented to the Conference.

Mr. NAYLOR said Mr. Moss in this paper drew the conclusion that the aqueous extract contained saponin, the evidence being its frothiness. He need not remind Mr. Moss that there were other bodies which frothed besides saponin, but they were not difficult to distinguish, because saponin on decomposition by an acid, not only yielded glucose, but another compound which readily crystallized in a very characteristic manner.

Mr. HOLMES said the root of this plant was used in the Philippine Islands as a substitute for soap, so that saponin, or a substance closely allied to it, might be supposed to occur in the fruit.

Mr. Moss said the effect on the aqueous solution was not the only observation he made on which he based the conclusion that it might contain saponin, but it gave other reactions which were almost all those of saponin; its behaviour towards sulphuric and nitric acids, for instance, and its insolubility in various solvents he had named, although, by the way, with respect to that character there was a good deal of conflict. There were as many saponins almost as there were different varieties of tannic acid, dependent on the source from which they were obtained, but they did generally agree in respect of the reactions he had drawn attention to. The fact of the frothing, after having noticed the other reactions, was confirmatory of the conclusion.

The next paper was a—

REPORT ON BLAUD'S PILLS.

BY T. MABEN.

In pursuance of my duties in connection with the preparation of the British Pharmaceutical Conference Formulary I have had occasion during the year to direct my attention to Blaud's pills, and as the subject is one that has an interest to every practical pharmacist I have drawn up this somewhat detailed report.

It is not necessary that I should go into the history of Blaud's pills, and I therefore go no further back than the Codex of 1884. We have there the authoritative process for preparing "pilules ferrugineuses de Blaud," a process which has been in use in France for certainly more than twenty years. With the exception of what was evidently a misprint the process was transferred *verbatim* from the edition of 1866 to that of 1884; the mistake in the earlier edition consisting in directing the pill mass to be divided into one hundred and twenty in place of two hundred pills. The process is as follows:—

"*Pilules Ferrugineuses de Blaud.*

Pure ferrous sulphate, dried and powdered	30 grams.
Pure potassic carbonate, dried . .	30 „
Powdered gum arabic	5 „
Distilled water	30 „
Simple syrup	15 „

Dissolve the gum in the water in a porcelain capsule by the aid of a water-bath: add the syrup and the sulphate of iron. Stir for several seconds in order to render the mixture homogeneous, add the carbonate of potassium previously powdered, stirring constantly with an iron spatula, and continue the heat until the mass has acquired a pilular consistence, rather hard than soft. Withdraw from the fire and divide the mass into two hundred pills, which are to be dried in a hot air chamber and silvered. Keep in well stoppered bottles. Each pill weighs about 40 centigrams."

This process is, no doubt, that by which Blaud's pills are prepared in France, and it is a question seriously deserving of discussion whether we in this country ought not to adopt it as it stands. I am not old enough to say whether the pills which made the reputation of this medicine in Britain were prepared according to the Codex or not, but the probabilities of the case are strongly in favour of the supposition that they were.

The chief point that strikes us in connection with the form is that dried sulphate of iron is used. The Codex gives no directions for drying this salt and no indication of what its composition is, but we may safely assume that it will be correctly represented by the formula $FeSO_4 . H_2O$. If we reduce the metric weights to the British standard each pill weighs about 6 grains, and contains 2·3 grs. of dried ferrous sulphate and a like quantity of dried potassic carbonate, this being equivalent to $1\frac{1}{2}$ grains of ferrous carbonate. It is also evident that there is an excess of alkaline carbonate

over that required to effect decomposition, but this does not materially affect the main point, which may be stated thus: Blaud's pills are prepared according to the Codex with dried ferrous sulphate, and each pill contains 1½ grs. ferrous carbonate.

Before we consider the question how far British methods differ from that which I have just given it may be desirable to ask whether we are justified in departing from the French process and adopting one of our own. Here we have a medicine which is essentially French, in so far as the origin of this particular method by which it is administered is concerned. We even know it by the name of the Frenchman who first brought it into fame, and still further there is a recognized and authoritative form for its preparation in the French Pharmacopœia. If we ask this question with reference to many other less known French galenicals we would have no difficulty in finding the answer; we should certainly adopt the Codex as our guide, and if in these, why should we not be equally ready to adhere to that standard in so far as this preparation is concerned? To this I reply by asking another question, Is this the best process for attaining the desired result? If it is, we can have no hesitation in adopting it; if not, then we are justified in trying to find more scientific means for attaining the end in view.

This brings us at once face to face with the further difficulty, viz., what is that desired result? in other words, what is the "intention of the prescriber?" Of this we need be in no doubt whatever, the Codex being the judge; those who have prepared Blaud's pills by that process will be able to corroborate what I say, viz., that ferrous carbonate is most undoubtedly formed in the pill mass. The direction that the pills are to be kept in well stoppered bottles is clearly intended to prevent its oxidation. It is equally certain that the writers on the subject of forty years ago distinctly recognized the fact that carbonate of iron was formed, and specially directed their attention to the best means for preserving it unaltered. What, therefore, we require to decide is, whether the Codex process is the most satisfactory for the production of ferrous carbonate.

This question, however, arises here: How far do Blaud's pills, prepared by British methods, represent those prepared according to the process I have quoted? It is safe to say that there exists a very great variety of processes for this popular medicine; each individual pharmacist may probably use his pet variation in preference to that of every other pharmacist. Martindale, who stands *facile princeps* in the region of pure pharmacy, has lent the authority of his name to a method in which crystallized ferrous sulphate equivalent to 1 gr. of ferrous carbonate is employed. On the other hand, from those who recommend dried sulphate, we have formulæ giving 1 gr., 1⅓ gr. and 1¾ gr. ferrous carbonate in each pill.

The term "Blaud's pills" has become so associated in the minds of medical men with sulphate of iron and carbonate of potassium, that to many prescribers it never occurs to look further and consider whether there may be any possibility of variation in the strength and condition of the dose they are prescribing. In numerous cases they are content to write—

℞ Ferri sulph.,
Potass. carb. . . . . āā grs. iiss.
M. ft. pil.

and leave the compounding of the pill to the judgment of the dispenser. In this they do well, even though in the doing of it they pay us an unintentional compliment. It is the sphere of the pharmacist to combine drugs in a scientific manner, and when medical men who are not also trained pharmacists invade that sphere the chances are that successful pharmacy will be at a discount. An illustration of this occurs in a valuable book, recently published, on pharmacy and correlated subjects. It is admitted that the author, in so far as he dealt with these correlated subjects, scored a distinct success; but he is not a practical pharmacist, and when he comes to treat purely pharmaceutical points the usual result happens. This is what he says regarding the subject of this report: "Blaud's pills.—A commonly ordered pill is one containing 2½ grains each of sulphate of iron and carbonate of potassium; a little soft paraffin and cacao butter will form a good mass without encouraging chemical action; or the salts can be rubbed together and allowed to stand for half an hour, when a soft paste results which can be made into a mass with tragacanth powder and a drop of water." These two processes are, to use the mildest possible term, extremely unsatisfactory, and it is difficult to understand how either of them could have been recommended, save by a theorist who had never attempted to put his ideas into practice. To begin with, they contradict each other. The intention of the first, evidently, is that the pills may be made with as little chemical action as possible; the second expressly provides for the maximum amount of chemical action. Again, it is not the case that the first process prevents chemical action, if crystallized sulphate and hydrous carbonate are employed; the reaction proceeds in spite of the soft paraffin. With dried salts the result may of course be different, but no mention is made of dried salts here. Lastly, the alternative process is as bad as could possibly have been suggested, inasmuch as there is nothing to prevent the oxidation of the ferrous carbonate, and it is simply a question of time till the pill consists for the most part of ferric oxide. Having reference to theories such as these it will be admitted that pharmacists are an essential part of the social fabric, and that our services could ill be dispensed with.

It is perfectly certain, whatever else may be doubtful, that the "intention of the prescriber" in ordering Blaud's pills, is that ferrous carbonate should be administered to the patient. This is admitted on all hands. Some pharmacists, however, and some medical men also, appear to think that the carbonate of iron is formed after the ingestion of the pill, and hence they recommend that dried sulphate of iron be employed in order to delay chemical action as much as possible. I have already shown that the Codex orders the dried salts, though by no means with the view of preventing chemical action; but however much we may wish to follow this authority, there are, undoubtedly, objections to the use of dried sulphate. In the first place its composition is uncertain; unless great care be taken in the drying, there is the possibility of its partaking of a more or less basic character, which would interfere to a certain extent not only with the strength of the dose, but also with the reaction. There is a popular notion that pills prepared with the dried sulphate are peculiarly uniform and stable, but this is erroneous. It is absolutely certain, in spite of all medical opinions to the contrary, that if an aqueous excipient be employed, no matter how Blaud's pills are prepared, some reaction will take place, and the use of dried sulphate makes no exception to this rule. I have ascertained repeatedly that there is a loss of ferrous salt when pills are so prepared. For example:—

Blaud's pills prepared without heat with ferri sulph. exsiccata, sugar and glycerine—

Each pill contained (by theory)	1·04 gr.	$FeCO_3$	
,, ,, when made	0·98 ,,	,,	
,, ,, after 2 weeks	0·80 ,,	,,	
,, ,, ,, 4 ,,	0·71 ,,	,,	
,, ,, ,, 6 ,,	0·60 ,,	,,	

This change is explicable on one of two hypotheses. Either the sulphate has been converted into carbonate and then into ferric oxide, or a portion of the sulphate has been split up into ferric sulphate and ferric oxide. In either case, a reaction has taken place; in neither case will all the iron reach the stomach in a ferrous condition.*

* In a paper on Blaud's pills (*Pharm. Journ.*, [3], xvii., 775), Mr. Duncan gives the results of his estimations of some samples, and three of these, he assumes, judging

In preparing these pills from dried sulphate the details of the Codex have not been adhered to, for the simple reason that these are so clumsy and tedious that I would hesitate to recommend them. If we could ensure a more satisfactory preparation by employing heat, by all means let us put up with what might otherwise be unsatisfactory, but I do not find that the results are even as good as those obtained by the use of hydrous sulphate in the cold. The loss in ferrous salt is much greater; even in preparing a small batch the loss has never in my hands been under 10 per cent.; with large quantities where the mass is much longer exposed the loss is no doubt greater still.

Even if we admit for the sake of argument that Blaud's pills can be so prepared that the reaction does not take place till the pill is dissolved in the alimentary canal, the theory that ferrous carbonate will then be formed will not in my opinion bear examination. When the pill is dissolved the potassic carbonate will doubtless be decomposed by the hydrochloric acid in the gastric juice, before the ferrous sulphate can possibly be reacted on. In the event of there being an excess of acid, all the potassium salt will be converted into chloride, and only the carbonic dioxide which would be present in the solution would be available for reaction with the ferrous sulphate. The laws of chemical affinity are such that this would be the certain result if the experiment were tried in a glass beaker, and I am not aware of any reason which would lead us to expect a different reaction in a beaker made of flesh and blood. The theory is absurd in itself, and the fact that it has been propounded by medical men has led some timid pharmacists to talk a good deal of nonsense, which has surely reached its climax when we are seriously asked to believe that capsules containing ferrous sulphate and potassic carbonate done up in the form of a salad will give a sure and certain dose of ferrous carbonate.

From what has been advanced it will be seen that I am not particularly favourable to the use of dried sulphate of iron, and if my arguments are sound, we are thrown back on the only possible alternative, viz., the crystalline sulphate, and the first point to be settled is how much ought each pill to contain? The Codex as we have seen requires 1½ gr. ferrous carbonate, and if we are to follow this precedent, we would require 3¾ grains ferrous sulphate and 2¼ grs. potassic carbonate. This would make a larger pill than we are accustomed to, but still its bulk would not be much, if anything, over that of an ordinary 5 grain pill. Medical men have, however, become so accustomed to prescribe 2½ grains, and that strength finds a place in so many text-books that it would be unwise to make any alteration, and I have therefore decided to adhere to this proportion. In the determinations that have been made, each pill contains 2½ ferrous sulphate which is in theory equivalent to 1·04 grain anhydrous ferrous carbonate.

The sulphate may be used either in a form of large crystals, or in the granular condition. The latter is certainly the more stable salt of the two, and there is less chance of its being contaminated with ferric compounds, but I have not found that the pill possesses any advantages over that made with the large crystals: in point of fact, either variety may be employed.

The essential requisites for Blaud's pill mass are:—

1. That it be a good workable mass: not too soft and not too hard. It will be found in practice that a mass can be made without the addition of any moisture, the water of crystallization which is set free being sufficient excipient of itself. The following equation probably explains the reaction which takes place:—

$$FeSO_4.7H_2O + K_2CO_3 = FeCO_3 + K_2SO_4 + 7H_2O.$$

I find, however, that such a mass, even with the addition of sugar, contains less ferrous carbonate than one prepared with the addition of a small quantity of glycerine and water. Moreover, I have found that the harder the pill mass, the greater the liability to oxidation. A very soft pill, with glycerine as the excipient, oxidizes much less rapidly than a hard pill, and, consequently, I recommend the addition of a little moisture, especially where gelatine coating is not resorted to.

2. That the reaction is complete before the pill mass leaves the mortar. There is no difficulty in this, and it is very desirable, if only in the interest of the pill itself, so far as physical appearance is concerned.

3. That the largest possible amount of ferrous salt be retained in the pill. I have frequently produced pills containing 1 grain of ferrous carbonate, and with ordinary care ·95 grain may always be relied on.

4. That precautions be taken to prevent oxidation. Of the expedients employed for this purpose, sugar and glycerine are the most serviceable. The Codex uses the former, but the latter is even more satisfactory. Experiment has proved that pills made with sugar oxidize more rapidly than those made with glycerine, as for example, with sugar each pill, after six weeks, gave ·7 gr., and those with glycerine gave ·9 gr. ferrous carbonate.

The objection to glycerine alone is its hygroscopic nature, and this last pill was much too soft. I have, therefore, thought it well to combine the two in order that both may have their influence, and the pill be at the same time sufficiently hard.

The result is seen in this example:—

Made with sugar and glycerine each pill, when prepared, gave 1 gr. $FeCO_3$.

At the expiry of two weeks, each gave ·87 gr. $FeCO_3$.
„ „ four „ „ ·81 „
„ „ six „ „ ·80 „

The result of the absence of sugar and glycerine is well seen in this example:—

Each pill contained, two months after preparation, ·30 gr. $FeCO_3$; four months after preparation, ·12 gr. $FeCO_3$; and this is the inevitable result of preparing the mass according to the method which I have already criticised.

There is still another method for protecting the pill from oxidation, viz., coating. This is employed in addition to the means already referred to, the object being to preserve the pill from contact with the atmosphere. It is now admitted that taken over all gelatine forms the most satisfactory coating for pills, and I find it is successful in preventing, in a large measure, the oxidation of the ferrous carbonate. For example, pills prepared with sugar and glycerine gave, when made, ·98 gr. $FeCO_3$. They were slightly dried in hot air, and then coated with gelatine. Each pill, after the lapse of two weeks, showed ·92 gr., and after four weeks, ·90 gr. $FeCO_3$. If, therefore, the pills are carefully prepared and rapidly coated with gelatine, we may have every confidence, when we send out Blaud's pills, that they will really contain a large proportion of ferrous carbonate.

The quantity of potassic carbonate in each pill is a point of some importance. It is undesirable to have a large excess of free alkali; indeed the nearer we approach to theoretically correct proportions the better. Theory requires 1½ grain (nearly) of carbonate of potassium with 16 per cent. of moisture for 2½ grains of ferrous sulphate, consequently it is obvious that 2½ grs. of carbonate as usually prescribed, is quite a superfluous, if not a mischievous quantity. I have found on experiment that pills prepared with the larger proportion of carbonate oxidize more readily than those prepared with the smaller. For example, pills prepared with 2½ grs. each ferrous sulphate and potassium carbonate gave after two months ·6 gr., whereas those prepared with 1½ gr. carbonate, gave ·7 gr. ferrous carbonate. This was the only experiment

from the quantity of ferrous salt present, to have been made from the dried sulphate. The large percentages found by no means conflict with what I have stated, and it would be impossible to draw any reliable conclusions from the figures given, unless we knew (1) How much ferrous sulphate was put into the pills, and (2) how long they had been kept previous to estimation.

tried for this particular object, and too much weight need not be put upon it; but I may remark that the same ratio was observed after four months.*

On a review of all these facts, I recommend the following process for Blaud's pills:—

Take of—

Sulphate of iron	60	grains.
Carbonate of potassium	36	„
Powdered sugar	12	„
Powdered tragacanth	4	„
Glycerine, Distilled water	of each $2\frac{1}{2}$	minims.

Reduce the sulphate of iron to fine powder, add the sugar and tragacanth and mix intimately. Finely powder the carbonate of potassium in another mortar and thoroughly incorporate with it the glycerine and water. Transfer this to the mortar containing the sulphate of iron, beat thoroughly till the mass becomes green and assumes a soft pilular consistence, and divide into twenty-four pills. Coat the pills with gelatine, previously drying them in hot air if necessary.

Prepared in this way Blaud's pills contain ferrous carbonate, and will preserve it unoxidized for a very long time.

The PRESIDENT having proposed a vote of thanks to Mr. Maben,

Mr. MARTINDALE said the pill of carbonate of iron of the Pharmacopœia was a much more definite and satisfactory article than Blaud's pill. He did not know who Blaud was, but he found in the first volume of the *Pharmaceutical Journal*, the first series, a paper by the Editor, Jacob Bell, upon Blaud's pill, and he rather disagreed with what Mr. Maben said on the subject. This was a translation of a report of a French pharmacist, M. Boudet, and he recommended the sulphate to be dried very carefully not above 30° or 40° C., in which case the iron lost about 20 per cent. of water, not nearly 50 per cent., which the dried sulphate of iron of the Pharmacopœia lost by drying it at the high temperature employed. He confessed that so far as his work had gone of late he rather favoured the French Codex process, because pharmacists had not only to make these pills, but to keep them, and to keep them coated in some sort of way so that they should be presentable for some length of time. He thought Mr. Maben's formula would limit their keeping to a short time. The pills would contain at first the largest quantity of ferrous carbonate, but they would not keep as well as they ought to for the ordinary purposes of the pharmacist's business. He got two of his assistants to make experimental batches of these pills, which he had brought with him, and the result was that it was a question in his mind whether the word "beat," as Mr. Maben read it, should not have been "heat" together so as to assure a complete change. His assistant reported that when merely beaten together the pills were not so satisfactory as when they were heated together. With that little change the process would work very well. The addition of glycerine and a small quantity of water might be an advantage, especially glycerine, as it enabled the pills to be coated with gelatine. He had also brought some pills prepared by the Codex process on a larger scale; the others were made on a smaller scale, and hardly showed the characteristics of what a pill should be. They sometimes had orders for grosses of them to be supplied at short notice, and therefore these pills had to be kept in stock, and under these circumstances and conditions he did not think Mr. Maben's process so applicable. As he had said, in respect to the quantity of ferrous carbonate, if they were to be used immediately, no doubt Mr. Maben's process was the best, but where the pills had to be kept the Codex formula would have the preference.

* Mr. Duncan's experiments supply corroborative evidence on this point. Pills made according to Ince's form oxidized more rapid y than those made by Martindale's.

Mr. CROSS asked if Mr. Maben had tried to manufacture these pills with granular sulphate of iron.

Dr. SYMES said his experience rather bore out Mr. Martindale's remark, viz., that saccharated carbonate of iron pills when carefully prepared kept remarkably well, and he could not help thinking that if medical men could be persuaded to order carbonate of iron pills instead of Blaud's pills, they would be more satisfied, and they would get more carbonate of iron than they would get in Blaud's pills which had been prepared for a length of time. Some years ago he happened to find several samples of carbonate of iron which had been put away and lost sight of; one sample was in a paper parcel, and he quite intended throwing it away without troubling to examine it, but he was surprised to find how very little difference there was in the sample which had been wrapped up in two papers and kept dry for twelve months, and another contained in a bottle about a quarter full, which had been kept perhaps six months, as compared with another sample of more recent date. He quite expected that there would be the widest possible difference, but he found that even that in the paper parcel contained still a good quantity of ferrous carbonate. He should therefore be disposed to support Mr. Martindale's view, that leaving their French friends to prepare pills as they thought fit, they should endeavour to persuade English medical men to order a recognized pill. He was inclined to favour the use of heat in preparing Blaud's pills. A gentle heat should be used, a little sugar added early in the process, and their manipulation rapidly conducted. There was a great deal in getting Blaud's pills finished off quickly. The object was to bring about decomposition in the quickest possible manner, and get the pill into a mass. He thought the French recommended these pills to be silvered, which was about the worst course to take with iron pills; they should either be coated with sugar or with gelatine.

Mr. NAYLOR said he spoke with some hesitation after the remarks of Mr. Martindale and Dr. Symes, but his experience was that these pills could be made very well by simply beating; and comparing them with the pil. ferri carb., he had found the pil. ferri Blaud made by beating to contain more ferrous carbonate, pill for pill, than the pil. ferri carb. sac. made with saccharated iron.

Dr. SYMES asked whether Mr. Naylor, in testing these preparations comparatively, had in each case taken freshly made pills.

Mr. NAYLOR said he took fresh pills in both cases.

Mr. MABEN, in reply, said he did not wish to dispute the fact that the carbonate of iron pill of the B.P. might be better than the other; but pharmacists had to make Blaud's pills, and the question was how should they make them, though it would perhaps be better if doctors would confine their attention to the Pharmacopœia pill. He had no doubt that heating would cause combination to take place better than beating, but he thought heating gave less ferrous carbonate. His objection to the French process, in addition to the length of time it took, was principally in the fact that there was a considerable quantity of ferrous carbonate lost in the process. He also thought the pills made by this process would keep quite as long as those made by the Codex process. He had used the granular sulphate of iron, but the result did not really differ from that obtained with the crystalline sulphate. Either one or the other might be used.

Mr. MARTINDALE said there was one thing with regard to Blaud's pills; there were $2\frac{1}{2}$ grains of carbonate of potash to $2\frac{1}{2}$ grains of sulphate of iron ordered in each—too great an excess of carbonate of potash which made the pill decompose rapidly—it produced deliquescence.

Mr. MABEN said it was undesirable to have a large excess of free alkali.

The next paper was on—

Two Species of Vesicating Beetles from South Africa.

BY J. OLDHAM BRAITHWAITE,

Pharmaceutical Chemist.

A small consignment of native "blistering flies" was recently sent from Cape Colony to Messrs. Hale and Son, the well known drug brokers, by one of their clients there, who states that the beetles are much used by the natives and by local medical practitioners for producing vesication. It was thought possible that they might be usefully introduced here as a substitute for the "Spanish" and "Chinese flies," or as a profitable source of cantharidin. Having casually seen a few specimens, I applied to Messrs. Hale, who were good enough to request me to examine the beetles, and to furnish me with a sufficient quantity for a preliminary investigation.

The sample was composed of two species of *Mylabris*, neither of which could I find described in such pharmacological or entomological works as were accessible to me. For the identification of the species I am indebted to Mr. Cahan, of the Entomological Department of the Natural History Museum, who courteously informs me that they are two species of *Mylabris*, common in South Africa, *Mylabris bifasciata* and *Mylabris lunata*, and that there appears to be no record of either species, other than technical entomological descriptions. Under these circumstances I have thought that a description would not be without interest from a pharmacological point of view.

It was first necessary to separate the two species, which was easily done; it will be seen from the following figures and description, that they do not very closely resemble each other either in size or markings. It was found that *Mylabris bifasciata* comprised the bulk of the sample, namely, 93 per cent. of the whole; the smaller, *M. lunata*, only being 7 per cent.

Mylabris bifasciata (Fig. 1) varies in length from 20 to

25 millimetres; the antennæ are about 5 millimetres long, moniliform, consisting of eleven joints, the first two basal joints black, the remainder yellow, gradually increasing in size from base to apex; the head is gibbous, about 3 mm. in length, eyes prominent; thorax pentagonal, 4 mm. long by 3 mm. wide. Elytra, 15 mm. long, by 5 broad, crustaceous, convex, black, traversed by two undulating dark ochraceous-yellow bands, about 2 mm. in depth; the apical band is bordered by a rufescent margin, and is more rounded at the costal end than the basal band. The tarsi of the first two pairs of legs are five jointed, those of the last pair have four joints.

Mylabris lunata (Fig. 2) varies in length from 14 to 18

millimetres. The antennæ consist of eleven articulations, moniliform, gradually increasing in size from base to apex, the first four ba al joints black, the remainder ochraceous brown. Head gibbous, eyes prominent, thorax, equal in length and breadth. Elytra, 13 millimetres long by 4 broad; crustaceous black, traversed by two transverse sinuous bands, and having a very conspicuous reniform or semilunar spot at the base of each wing case, also another lenticular spot on the under costal basilar margin, which is not visible unless the beetle is turned over on its back. The colour of all these markings varies in different individuals, from a dull ochraceous yellow to a bright lemon chrome. The tarsi of the first two pairs of legs are five jointed, those of the last pair have four joints.

The next step was to determine if either species were active vesicants, and if so, the proportions in which the blistering principle existed. As the quantity of *Mylabris bifasciata* available was so much greater than that of *M. lunata*, this species was operated on first.

Experiment 1.—Five grams of the powdered beetles were exhausted by percolation with acetic ether, the menstruum, when evaporated, leaving 0·522 gram of residue or 10·44 per cent. It was a yellowish green extract, semifluid at 80° F., smelling strongly of the flies. Upon exposure to the air, it slowly turns green, and immediately on the application of nitric acid, it gives a fine green colour. Examined by the microscope, an abundant crop of flattened needle-shaped crystals was observable, as well as the crystals of fatty acids. About three milligrams of this extract applied to the skin of the forearm raised a large blister, which contained from 2 to 3 c.c. of serum, in from three to four hours. (These experiments of actual vesicating power were conducted on myself and on an assistant, so that the error due to personal idiosyncrasy might be avoided.)

Experiment 2.—Five grams were similarly exhausted with petroleum ether. This gave 0·595 grams or 11·9 per cent. of an oily residue; although the crystals remarked in the previous experiment were not so numerous in this instance, three milligrams of the extract produce a large blister when applied to the forearm.

Experiment 3.—The extract of exper. 1 was treated with petroleum ether, which removed a yellow fatty matter. The residue was dissolved in chloroform, digested with animal charcoal, and filtered; upon evaporation it deposited a crop of lamellar crystals exactly similar to cantharidin in microscopic appearance when viewed by polarized light.

Experiment 4.—Five grams of the powder were treated with acetic ether exactly in the manner prescribed by the Pharmacopœia for the preparation of "Liquor Epispasticus." Two drops of the resulting fluid, allowed to evaporate on the skin of the forearm, gave rise to a large blister, which filled with serum three successive times in twenty-four hours. A similar quantity of the official "liquor" prepared from cantharides only gave rise to slight, almost imperceptible, vesication.

The presence of abundance of vesicating principle being thus established, it remained to determine the quantity in which it occurs. After trying with cantharides, several published methods for the extraction of cantharidin, the following, which is practically that of Mortreux* with but slight modification, was adopted. I have found when working with *Cantharis vesicatoria*, that it gives similar results to the more tedious and lengthy process of Bluhm.†

(*a*) Twenty grams of the powdered beetles were exhausted by digestion with acetic ether, distilling off the solvent. The resulting extract freed from remaining traces of ether weighed 2·09 or 10·45 per cent. It was washed with successive portions of carbon bisulphide until nothing more was removable; the insoluble residue was then washed on a filter sparingly, with successive small quantities of rectified spirit, until colourless, the insoluble crystals dissolved in chloroform, crystallized, and cautiously dried until constant in weight. The alcoholic

* *Journ. de Pharm.*, [3]., vol. xlvi., p. 33.

† *Jahresb.*, 1864. p. 591.

washings were evaporated, but the amount of crystallized cantharidin contained was not found to amount to more than two or three milligrams. By this method no less than 0·204 gram, or 1·02 per cent., of white crystalline residue was obtained.

(*b*) Fifty grams of the powdered beetles were treated in exactly similar manner, omitting however, the final treatment by chloroform, since the residue left by careful washing with carbon bisulphide and rectified spirit was perfectly white and crystalline. This, when dry, weighed 0·545 gram, equivalent to 1·090 per cent. After weighing, the crystals were dissolved in chloroform, and a "specimen" crop of well-developed flattened prisms obtained by slow evaporation of the solvent.

A check experiment on 20 grams of *Cantharis vesicatoria* gave 0·084 or 0·42 per cent. The accompanying extractive was much higher than in the *Mylabris*, being equivalent to 18 per cent.

The crystals thus obtained from *M. bifasciata* agree in every particular with those of cantharidin. They crystallize in flattened prisms which are identical in microscopic appearance with those of that substance, and they decompose polarized light in a precisely similar manner. When one milligram of this substance is applied to the skin with a little lard, it causes active vesication. It sublimes slowly at from 180° to 184° C. into beautiful iridescent needles, and melts at 200° C. It is soluble without colour in strong sulphuric acid, and is thrown out of solution on adding water; in hydrochloric and nitric acids it dissolves when heated, and crystallizes out on cooling. It is also soluble in caustic potash and soda.

It would appear, therefore, that *Mylabris bifasciata* is extremely rich in cantharidin, yielding more than twice as much as *Cantharis vesicatoria*, and, since it is plentiful at the Cape, would probably be an economic source of the vesicant; it would also be far more easily extracted, since *M. bifasciata* does not contain nearly so much fatty extractive as *Cantharis*. I am unable to find any record of so high a percentage of cantharidin having been previously obtained from any vesicating insect.*

Attention was now directed to *M. lunata*, concerning which a brief entomological note appears in Dr. Cooke's paper on "Vesicating Insects."† The quantity available for experiment was extremely small.

Experiment 1.—One gram of the powdered beetles was treated in the manner directed by the Pharmacopœia for the preparation of the official *Liquor Epispasticus*. Two drops of the resulting percolate gave rise to only a slight blister when applied to the skin of the forearm. Exhaustion being completed by a further percolation with acetic ether and the menstruum evaporated, a residue of 0·112 or 11·2 per cent. was obtained. Upon examining *sub ente*, a few crystals were visible which were insoluble in carbon bisulphide. A few milligrams of this extract produced a fairly marked vesicant action, but which, however, was not to be compared with that obtained from the other species.

Experiment 2.—All that remained, viz., 5·061 grams, was treated for the determination of the cantharidin as in the case of *M. bifasciata*; only 0·015 or 0·296 per cent. of crystalline residue was obtained, which agreed with cantharidin in physical characters and melting point. Although from the small quantity operated on the above figures are not of very great value, they suffice to show conclusively that this *Mylabris* is very much poorer in cantharidin than its congener.

My thanks are due to my principals, Messrs. Wright, Layman and Umney, in whose laboratory these experiments have been conducted, and to my friend, Mr. R. W. Merrett, for having executed the drawings.

* The highest record I can find, is that of Werner, who obtained 0·815 per cent. from *Lytta aspersa* (*Journ. Chem. Soc.*, 1877, i., p. 723).

† *Pharm. Journ.*, [3], vol. ii., p. 261.

The PRESIDENT, in proposing a vote of thanks to Mr. Braithwaite, said he understood that this particular vesicating fly was brought to the notice of the Conference some twenty years ago, but then received but brief attention, and, so far as he knew, from that day to this it had not been examined, so that Mr. Braithwaite had the credit of being the first to give scientific attention to the qualities of this beetle.

Mr. WILLIAMS asked if the beetle could be produced as a mercantile article, because the quantity of cantharidin named was very interesting to the manufacturer, being larger than that found in the true *Cantharis* beetle. There was often a quantity of cholesterin found in connection with cantharidin in many species of flies, but he supposed the author had been careful to separate the two bodies, because he spoke of a fatty acid, and cholesterin was not a fatty acid, it was perfectly neutral. The quantity of cantharidin named was about twice that ordinarily found.

Mr. MOSS said this was a very practical paper, and was likely to be very useful, provided the observations contained in it were correct, as might be assumed, considering the author. The flies he spoke of belonged to the same genus as that which yielded the greater part of the cantharidin of commerce—the *Mylabris*. It was well known that cantharidin was obtained from that genus in preference to the *Cantharis*. The price of Spanish cantharides was now very high, three times that of the Chinese flies or *Mylabris*. Again, in addition to the direct economic advantage *Mylabris* seemed designed by nature to yield cantharidin to the solvents used, because it gave up to those solvents a very small proportion of fatty matter which tended to prevent crystallization and the easy purification of the cantharidin. He understood from the paper that these two flies occurred in considerable quantities at the Cape, and that they might be collected economically, and as they contained about twice as much cantharidin as the Chinese *Mylabris* no doubt there would soon be a market for them, besides which they would use flies coming from a British colony rather than those coming from China.

Mr. BALKWILL said he had been much interested by this very practical paper. If it pointed to any promise of having a more satisfactory preparation for liquid blister than the liquor epispasticus of the British Pharmacopœia it would be very gratifying to the ordinary pharmacist. If from these flies a pure cantharidin could be prepared in sufficient abundance to enable them to have a solution of it for blistering purposes, instead of the present preparation, which was about as uncertain as anything in the Pharmacopœia, it would be exceedingly satisfactory.

Mr. LASCELLES-SCOTT said he had had several varieties of *Mylabris* sent to him with the intimation that they were likely to contain cantharidin, but had not been successful in obtaining a blister either on himself or on any other subject, nor except in one instance had he found the smallest trace of cantharidin. He was bound to say, however, that those insects he had examined were not of the same species as had been referred to in the paper.

Mr. HOLMES said he had heard from those who made cantharidin that the Chinese flies were very unsatisfactory, because although they yielded in some cases a large amount of cantharidin, in others they yielded only a small quantity. This might be due to the fact that the Chinese *Mylabris* consisted of two species, the *Mylabris phalerata* and the *Mylabris Cichorii*, the two species being mixed in varying proportions. There might be the same difficulty with these two species from the Cape, unless the *M. bifasciata* described by Mr. Braithwaite could be kept free from the *M. lunata* in the imported article; otherwise there would be always a certain amount of uncertainty in the yield of cantharidin.

Mr. NAYLOR said it was especially mentioned in Mr. Braithwaite's paper that the *Mylabris bifasciata* was very plentiful at the Cape, and with reference to the purity of

the article, and the cantharidin extracted, he gave the characters, which seemed very definite; the cantharidin crystallized in flattened prisms identical in microscopical appearance with the cantharidin from the cantharides.

The next paper was a short—

NOTE ON THE CULTIVATION OF ENGLISH RHUBARB.

BY W. ELBORNE, F.L.S.,

Assistant Lecturer in Materia Medica in the Owens College, Manchester.

In a report on English rhubarb read before the British Pharmaceutical Conference in 1884,* I stated that the cultivated product of *Rheum officinale* occurred in two forms, known as "highly cultivated" and "ordinary cultivated," and that by the results of my analyses the latter product was superior to the former as regards active constituents. Founded upon those results the high cultivation of *R. officinale* has since that date been abandoned, and the whole of the English-grown rhubarb yielded by that species is a product of natural and "ordinary cultivation," constituting a drug of more compact structure and activity. In reference to the authenticity of this drug I may remind you that the plant from which it is derived was obtained by French missionaries in Thibet in 1867, and transmitted to Dr. Soubeiran and grown in the garden of the School of Pharmacy at Paris, and subsequently described by Professor Baillon.† From this source offsets of the root came into the possession of Hanbury and Flückiger, and through them into the hands of the late Rufus Usher of Bodicote, who succeeded in propagating it, and whose successors are now the sole producers of the same in this country.

I would again draw attention to the great similarity in appearance and general characters which exists between this English-grown *R. officinale* and the dark veined variety of the East Indian imported drug, suggesting probably that the latter is of similar origin. Specimens of these varieties are exhibited, which upon inspection will be found to possess a large number of characters in common.

Members interested in the subject were invited to examine the specimens after the meeting.

A vote of thanks was passed to Mr. Elborne for his paper.

The next paper read was on—

OIL OF EVODIA: A NEW DEODORANT FOR IODOFORM.

BY H. HELBING,

Apotheker of the German Hospital, London.

The deodoration of iodoform has, it must be confessed, not yet been successfully achieved, in spite of numerous experiments with various correctives. Cumarin, ol. menth. pip., ol. eucalypt., roast coffee and other things have been tried with more or less success, but generally the latter.

Under these circumstances I think I may be permitted to call your attention to the value of the essential oil of *Evodia fraxinifolia* as a deodorant. I had an opportunity of examining the fruit of this plant and found that it yields an oil having a most agreeable and powerful odour, which is even able to overcome the smell of iodoform, either in its crystalline shape or in solution. For practical purposes it is only necessary to add a little (2 drops to the oz.) of the essential oil to the disinfectant in order to obtain a complete deodoration of the latter, the chief objection which has been raised against the use of this valuable remedy thus being obviated. I would be very pleased to find my observations confirmed by experiments of others. As to the botany of *Evodia fraxinifolia* I may refer to Christy's 'New Commercial Plants,' No. X. He says:—

"It seems probable that a description of *Evodia fraxinifolia* was first published under the name of *Rhus fraxinifolium* in Don's 'Prodomus Floræ Nepalensis,' 1825. The plant is described as a large tree, a native of Nepal, with pinnate leaves, the pinnæ lanceolate, acuminate, serrate, glabrous and shining, the panicle much branched and villous. Sir William J. Hooker, however, subsequently pointed out that the floral characters did not agree with those of the genus *Rhus*. In the 'Icones Plantarum,' 1848, plate 710, it is referred to Blume's genus *Philagonia*, and a good figure accompanies the letterpress. The plant is placed under the natural order *Terebinthaceæ*; and a reference is given to *Tetradium* (?) *fraxinifolium* of Wallich in Herb. Hook., 1821. In the recent work, Hooker and Bentham's 'Genera Plantarum,' the species is included in the genus *Evodia* under the natural order, *Rutaceæ*, and it is identified with the *Tetradium trichotomum*, described in Loureiro's 'Flora Cochinchinensis,' p. 91, which is there mentioned as having trichotomous racemes of whitish flowers, the tree, of medium size, inhabiting the hills of Cochinchina. Sir W. J. Hooker's description of the species may be thus summarized:—Dicœcious leaves impari-pinnate, glabrous; leaflets elliptical-oblong, acuminate, sub-serrate; the base oblique; the lateral leaflets nearly sessile; the terminal leaflet with a rather longer petiole; the cymes paniculate, pubescent, axillary and terminal; the flowers generally tetramerous (sometimes pentamerous), the inner surface of the petals silky; the four stamens are slightly longer than the petals; the ovary 4-celled; an inhabitant of Nepal."

The fruit as supplied to me by Mr. Christy consists of three or four carpels placed together in the shape of a star; these are brown on the exterior, and dotted with small warty points; each carpel contains one seed of a roundish heart-shape and resplendent black colour, having a diameter of 4–5 millimetres. Besides the fruit the sample contained a good many remains of stems, consisting of hard wood, black on the outside and striated longitudinally, being slightly flattened on the transverse section.

The fruit has a very strong odour, and yielded on distillation about 4 per cent. of a thin fluid essential oil of a very pale yellow colour; I could obtain no particular reactions with it. It has, as I already remarked, an exceedingly agreeable and intense odour, similar to bergamot; its specific gravity is very low, not exceeding 0·840; it is soluble in alcohol and ether and has a pungent, smarting taste.

The PRESIDENT in proposing a vote of thanks to Mr. Helbing, said if he had discovered a true disguise for this intensely pungent chemical, he had offered pharmacists a distinct advantage.

Mr. MARTIN asked what was the source of the oil of evodia.

Mr. CHRISTY said he had some doubts whether it would be possible to get this oil in any quantity until the plant was grown in our own colonies. He was fortunate enough to obtain a few seeds which had germinated, and he was distributing them in the colonies, and hoped thus to obtain fruits. It was very difficult to obtain, because the trees were cut down by the natives. The seeds which came into the market came from a very small shrub. He had tried to dissuade Mr. Helbing from bringing the matter forward now, because there was not yet sufficient information to enable them to form a conclusion upon it.

Mr. LASCELLES-SCOTT said it would be his unpleasant duty to throw cold water on this suggestion. He had been making experiments on some oil of evodia in his possession, although not with the same view as the author of the paper. But on seeing the title of the paper in the published list, remembering his old experiments with reference to iodoform some years ago, and knowing something about the active properties of this oil, he had great doubts

* 'Year-Book of Pharmacy,' 1884, p. 435; *Pharm. Journ.*, [3], xv., 136.

† *Pharm. Journ.*, [3], iii., 301.

as to whether there was much in it. He was bound to say that the sample produced did not seem to bear out the statements in the paper. There were several essential oils which would to a certain extent mask the odour of iodoform. A well-known Indian oil, the oil of spikenard, would do so far more perfectly than that of *Evodia fraxinifolia*.

Mr. HOLMES asked what oil Mr. Scott referred to. He believed the Indian oil of spikenard was not known as an oil of commerce.

Mr. LASCELLES-SCOTT said the sample he had was one obtained officially from the India Office some years ago.

Dr. SYMES said this oil did not appear to accomplish the object intended to any verymarked degree, and, therefore, it was scarcely necessary to trouble themselves at present, as to the difficulty in obtaining it. A great many substances had been suggested for this purpose; in his experience tonquin covered the odour of iodoform as well as anything he had met with. It was just a question which was the most persistent, and whether sufficient were used to cover the odour, or whether it evaporated before the iodoform was dissipated. Of course, the most persistent remained in all these cases.

Mr. HAMPSON asked what was the action of these various agents for disguising the offensive odour. They might get nearer the truth if they had some means of ascertaining why these essential oils acted in the manner they did.

Mr. HELBING said he found that the oil of evodia was superior to any other oil for this purpose. He found that when iodoform was mixed with a little peppermint oil or coumarin, of course the mixture did not smell like iodoform, but there was a very strong smell like peppermint or coumarin. Now, on the other hand, he found that the iodoform mixed with evodia gave no smell at all, and he believed the sample produced showed this. He had mixed different samples all of the same strength, two drops to one ounce, with several very strong smelling ingredients, but, so far as he could detect, that mixed with evodia oil had hardly any smell at all.

The following paper was then read by Dr. THRESH :—

CRYPTOPINE AND ITS SALTS.

BY DR. E. KAUDER.

Since the discovery and description of cryptopine by T. and H. Smith,* and its more recent investigation by O. Hesse,† nothing has been published with reference to the chemical characteristics of this alkaloid and its salts.

Having been lately engaged in preparing some of the rarer opium-alkaloids, I think a short notice of the method by which I prepared and purified cryptopine, together with an account of its different reactions, may be of some interest, more especially so as the description given by the discoverers differs in some degree from that of O. Hesse and from my own experience.

Preparation and Purification.—The mother-liquor, from which codeine, narceine, thebaine and papaverine have been separated in the usual manner, contains the cryptopine as a salt, together with extractive and resinous matters. That liquor was treated with excess of caustic soda, the resulting precipitate washed with hot water, and redissolved by hydrochloric acid. The solution, upon cooling, soon forms a gelatinous mass, which upon standing for two or three days changes into very soft crystals, that appear to float in the dark coloured liquor. Excess of hydrochloric acid sometimes accelerates the crystallization. The crude salt is collected on a filter, pressed, purified by recrystallizing from hot water and passing the hot solution through charcoal. The liquor upon cooling gelatinizes and crystallizes in the manner recently described by T. and H. Smith.‡

* *Pharm. Journ.*, [2], viii., 595, 717.

† *Annalen der Chemie und Pharmacie*, viii., Supplementband 299.

‡ *Pharm. Journ.*, [3], xvii., 515.

These crystals upon being dried shrink together, forming a hornlike substance. To obtain a more satisfactory product the salt is dissolved in hot spirit, from which it crystallized in beautiful soft masses *without* any gelatinous character. Even by this method I found it impossible to obtain crystals of any considerable size, and in drying the salt shrinks together, but without forming a horny mass. When mixed with water the crystalline form is clearly recognizable. The salt is then quite white and chemically pure, as ascertained by the following tests :—

Strong pure sulphuric acid* dissolves the salt with a violet colour, which, in a short time, changes into a deep blue. In about one hour, or immediately, if heated to 150° C., the blue fades away and the acid then has a greenish appearance. Sulphuric acid containing traces of oxide of iron dissolves the salt with a deep rose, having a violet tinge, which soon becomes distinctly violet, and, finally, deep blue within about five minutes. Standing for an hour, or upon being heated to 150° C., the reaction is the same as with pure sulphuric acid.

According to Smith's statements, cryptopine which dissolves in sulphuric acid with violet colour contains *thebaine*, but as I prepared cryptopine from the mother-liquor from which the thebaine had been separated, I felt confident that no considerable quantity of this alkaloid could be present. On the supposition, however, that cryptopine salt might contain traces of thebaine, I treated it in the following manner.

Thebaine is stated† to be decomposed easily by warming with excess of hydrochloric acid, whilst cryptopine suffers no decomposition. This is in fact a method which has been recommended to remove the thebaine. I therefore studied the reaction of hydrochloric acid on thebaine and can fully corroborate the previous statement. By treating muriate of thebaine (10 parts) with hydrochloric acid (200 parts) of 1·04 specific gravity to the boiling point and cooling immediately, a salt settles, sometimes directly in the crystalline state, sometimes as a sticky mass, which in a short time partly solidifies and recrystallizes from hot water in plates similar to meconic acid.

This salt, called muriate of thebenine, differs widely from muriate of thebaine, both in crystalline form and in its reactions with sulphuric acid. Pure sulphuric acid dissolves it with a dark blue-violet colour changing in a short time to a magnificent rose, which upon heating to 150° C. turns to a dirty green. Sulphuric acid containing traces of iron dissolves it with the same dark violet-blue colour, which soon becomes brownish-red, and on heating to 150° C. changes to brown with a greenish tinge.

This salt is very easily changed. Upon placing a drop of the colourless watery solution on a piece of filter-paper the latter is soon coloured red, through oxidation. Even in the dry state the salt gradually acquires colour by the action of light and air.

By boiling the solution of muriate of thebenine with excess of strong hydrochloric acid for a quarter of an hour, thebaieine and further decomposition products which do not yield crystallizable salts are formed.

On the basis of these facts, I boiled the cryptopine salt

* I may here state that there is no better reagent to identify opium alkaloids than strong sulphuric acid. The variety of colours produced by pure sulphuric acid, and by acid containing traces of oxide of iron is very great, and has proved to be of the utmost service. The reactions of cryptopine have been carefully repeated by me, and though the chief features are *nearly* the same as those already published, there are still some differences which I think advisable to point out. It has been shown that pure sulphuric acid kept in glass bottles sometimes takes up traces of iron from the glass. The best way of ascertaining whether the acid is perfectly free from iron is to try its reaction on codeine. Pure codeine does not give any colour with pure sulphuric acid, even after being heated, whilst sulphuric acid containing traces of iron produces a blue colour.

† *Annalen der Chemie und Pharmacie*, cliii., 47.

with hydrochloric acid for one hour, thinking that even traces of thebaine would be thereby decomposed. The salt which crystallized out upon cooling gave the same *violet* colour reaction with sulphuric acid. I therefore was sure that the violet colour could not be due to the presence of thebaine.

A second way of positively proving the purity of the salt was by preparing acid oxalate of cryptopine and allowing it to crystallize for two or three days in a cool place. This method not only proves the absence of thebaine but also that of protopine, since both alkaloids give salts which are more soluble in water than acid oxalate of cryptopine. The mother-liquor from the crystals was divided into two parts and both made slightly alkaline by a few drops of ammonia, which did not at once cause a precipitate. The first portion was extracted *immediately* by ether, the ether on standing deposited regular crystals of pure cryptopine, and on being shaken with hydrochloric acid and excess of hydrochloric acid added to the dilute watery solution soft crystals of muriate of cryptopine were formed in about one hour or two, perfectly free from hard crystals, which would have indicated the presence of *protopine*; the other portion of the ammoniacal liquor on being set aside for a day or two gave some crystals, which by their reaction with sulphuric acid and after being converted into acid tartrate proved to consist of cryptopine without a trace of thebaine.

A dilute solution of the chemically pure muriate of cryptopine in warm water was treated with ammonia in slight excess. The alkaloid thrown down was collected in a filter, washed, and dried. It was in a fine state of division, like magnesium, but its crystalline appearance was plainly recognizable with a powerful microscope.

Cryptopine is but sparingly soluble in boiling spirit, although sufficiently to allow of fair crystals being formed, having an opaque appearance. I may here state that although cryptopine is but slightly soluble in benzole (50 90) or solvent naphtha, these solvents can be used for preparing *transparent* crystals of the alkaloid. Cryptopine in powder as well as the crystals from spirit and from benzole was found to melt at 213° C. (=415·4° F.).* T. and H. Smith give the melting point as about 204·5° C. (=400° F.); Hesse, 217° C. (=422·6° F.).

Cryptopine when treated with hydrochloric acid suffers little or no decomposition, thus differing remarkably from some of the principal alkaloids of opium. One gr. muriate of cryptopine was heated with 20 gr. HCl of 1·04° specific gravity for one hour, care being taken to prevent evaporation of the acid. The hot liquor was made alkaline by ammonia; the precipitate washed with warm water and dried, weighed 0·695 gr., equal to 69·5 per cent. Theoretically, muriate of cryptopine should contain 71·8 per cent. of alkaloid. It is more than doubtful whether this loss is due to the alkaloid being partly decomposed, for it has been proved that some portion is retained by the ammoniacal solution, every drop of which produces a faint violet colour with sulphuric acid.

The reaction of both powder and crystals of cryptopine with sulphuric acid is the same, but *differs* essentially from that of the muriate. Strong sulphuric acid containing traces of iron dissolves it first with yellow colour, which turns to rose and violet, then becoming blue in about three minutes; on being allowed to stand for half an hour the blue changes to green.

Pure sulphuric acid dissolves it with a yellow colour, changing gradually to violet, dirty violet and greenish. The colours, however, are not so brilliant as those produced by acid containing iron.

Froehde's reagent dissolves cryptopine with a dark dirty violet colour, which becomes deep indigo-blue in half a minute, and at the end of half an hour changes to green, advancing from the edges until the whole liquor is uniformly coloured.

Most of the salts of cryptopine become very easily *electric*; on reducing them to powder in a porcelain mortar the crackling of small sparks is distinctly perceptible.

A good many of the salts crystallize either from water or spirit; most of them when dissolved in hot water form upon cooling first a jelly, which after some time begins to crystallize. So do, for instance, the muriate, the acid tartrate, the acid oxalate, etc. If a saturated solution of the latter is prepared by dissolving a sufficient quantity in boiling water it crystallizes as a rule directly without forming a jelly. A much stronger solution, however, prepared by making a strong solution of the neutral salt (which is much easier soluble in water than the acid salt) and adding a second equivalent of oxalic acid soon gelatinizes, but the next day the jelly is found to be changed into small prisms. So far as I experienced the acid oxalate is the cryptopine salt which can be obtained in largest crystals.

The non-crystallizability of the neutral sulphate of cryptopine is particularly remarkable, as has been pointed out by Hesse. As acid salts of dibasic acids seem to crystallize easier, I prepared the acid sulphate of cryptopine, which on cooling gelatinized. After standing for two months it showed some signs of crystallization, which after another two months had advanced but little through the jelly. This is particularly noticeable, as most sulphates of the alkaloids are not inferior in their crystallizing power to other salts.

The acid chromate, which is pretty soluble in boiling water, separates on cooling partly in heavy prisms, partly in light needles, which being dried are changed into the same heavy crystals, but of course of much smaller size, a reason why a sample of the salt does not look quite uniform. The same behaviour is shown by the double chloride of cryptopine and platinum; some of the cryptopine salts therefore are excellent representatives of physical isomerism.

Picrate of cryptopine crystallizes from spirit in fine yellow needles.

The neutral meconate of cryptopine is remarkable, and as far as I know has not yet been described, though it can claim interest, as most likely it is the form in which cryptopine exists in opium. Its properties differ somewhat from those of meconate of morphine, being, for instance, very insoluble in cold water. One hundred c.c. of a saturated solution at 14·5° C. were found to contain only 0·075 gram, which would correspond to a solubility of 1 part in about 1300 parts of 14·5° C. Boiling water dissolves a sensible quantity, and on cooling the solution the salt is deposited in fine silky needles. If the solution was saturated the whole liquor solidifies to a crystalline mass; if not very strong and cooled down quickly a jelly is formed first, which soon begins to crystallize.

Analysis.—0·642 gram substance dried in the open air lost 0·104 gram on being heated in an air-bath at 105° C. to constant weight.

0·4 gram substance precipitated with ammonia gave 0·2616 gram cryptopine.

The formula for meconate of cryptopine therefore is $(C_{21}H_{23}NO_5)_2C_7H_4O_7+10Aq$. This salt should contain theoretically—

		Found.
H_2O	=16·10 per cent.	16 21 per cent.
$C_{21}H_{23}NO_5$	=66·01 „	65·4 „

A portion of the cryptopine is of course carried away in the filtrate and washings.

Upon being dried the salt colours a little yellow, and though not entirely soluble in water afterwards, it recrystallizes from hot water in the same manner and with the same properties as the original salt. The dried salt easily attracts water in the open air.

* This melting point was estimated in the usual manner with an ordinary themometer without taking into account atmospheric pressure, etc., which might probably account for the difference between the melting point found by Hesse, to which it is very near.

Referring to a paper lately published,* it seems to be of interest whether cryptopine as a strong base like morphine can yield an acid meconate; my experiments on this point, however, are not yet finished.

Tannate of cryptopine is amorphous and very sparingly soluble in boiling water.

I am not aware that any experiments with cryptopine have been made on animal life; I think it would be interesting to learn its action on the system, but leave this to physiologists to undertake.

So far as I can judge cryptopine is contained in all kinds of opium in varying amounts; the quantity, however, is much larger than was supposed by T. and H. Smith. In one lot of 5000 lbs. of opium I found 3 lbs. of crude muriate of cryptopine.

My thanks are due to Messrs. John A. Wink and Co. for their courtesy in kindly permitting me to place this paper before the Conference, all the experiments having been made in their manufactory and with their material.

The PRESIDENT having proposed a vote of thanks to Dr. Kauder,

Mr. DOTT said the first thing to be observed was that the distinguishing of an alkaloid by colour reactions was a process always open to error, especially as what one man called violet another man called blue. The process of getting rid of the thebaine by treating with hydrochloric acid would not answer, because the decomposition product of thebaine and cryptopine yielded the same colour reaction. Further, he thought the author of this paper relied on the original statement of Mr. Smith with regard to the quantity of cryptopine that existed in opium, but it was well known to be a much larger quantity than was then believed.

Mr. H. B. BRADY said it was worth mentioning that the discovery of this alkaloid cryptopine was announced at the meeting of the Conference at Bath, when Messrs. T. and H. Smith sent a small specimen.

The Conference then adjourned until the next morning.

(*To be continued.*)

* *Pharm. Journ.*, [3], xvii., 690.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BLACK BEES OF TASMANIA AND THEIR MEDICINAL HONEY.

Sir,—The article under the above heading, which appeared in the Journal of June 11, had already found its way into our press. I enclose herewith the sub-leader of the Hobart *Mercury* of July 9, dealing with the subject. It had been clipped from the *Scientific American*.

The startling adventures of M. Guilmeth and his forty Kanakas could not fail to attract attention in Tasmania, but the story is rather too tall a one for us to swallow. The Monsieur has surely forgotten the exact part of the globe where he made the discovery. Possibly it may have been Timbuctoo!

Our bush bees are the descendants of those introduced into the colony by Dr. Wilson, R.N., in the ship *C. S. Forbes*, in the year 1831, and are the ordinary *Apis mellifica*, Linn. That large stores of honey are found by bushmen in felling forest giants is well known, and I was informed by an old splitter to-day that he had more than once found 70 to 80 lbs. in a hollow blue gum tree which he had felled. I believe as much as 150 to 200 lbs. has been found. But what of M. Guilmeth's 10,000 lbs?

Our bush honey has generally an unmistakable odour of eucalyptus, due to the flowers of that tree upon which the bees largely feed.

That the eucalypti contain splendid medicinal properties I am prepared to admit, far more so in my opinion than has yet been proven. It is in the fresh green leaves, too, that the virtue chiefly lies, more than in the oil, and they are used by settlers on the spot for a great variety of disorders.

For malarial fevers the fresh infusion of the leaves has a splendid effect, and will yet become a valued remedy when its preparation and preservation have been better worked out.

Hobart, Tasmania. H. T. GOULD.

[*** The communication referred to by our correspondent was a translation from a paper read before the French Academy of Medicine, in January last, by Dr. T. Caraman.—ED. PHARM. JOURN.]

MENTHOL WITH ACONITINE.

Sir,—The above combination being novel as well as extremely valuable, is my chief reason for bringing it before your readers.

It was in the first instance prescribed by Dr. T. Smith Rowe, of this town, and since then has been largely used by him and other medical practitioners, to whom its merits have been made known.

At the doctor's suggestion I have prepared it in three different strengths, viz., 1 in 500, 400 and 300, each strength having its distinctive colour, so as to be readily distinguishable when kept in stock, and thus prevent mistakes in dispensing the drug.

Thus the weakest is white, the medium strength yellow, and the strongest pale pink. I subjoin a formula which I have found to be precise and convenient in preparing the white (1 in 500) cones:—

℞ Menthol	ad 500 grs.
Aconitine pure	1 gr.
Sp. v. rect.	xxm.

Dissolve the aconitine in the spirit, then add the solution to the menthol, previously melted, and divide into 60 grain cones.

I may add I am receiving so many applications by post for these cones, and also letters from chemists asking for information respecting their preparation, that I feel an additional reason is afforded me for requesting the insertion of this memorandum in the next issue of the Journal.

Margate. JOHN BAILY.

THE BOTANICAL IDENTIFICATION OF HAMAMA.

Sir,—Mr. W. T. Thiselton Dyer, in his letter in your issue of September 10, p. 232, seems to imply that I have taken to myself credit due to Mr. N. E. Brown. In justice to myself, therefore, I beg to point out that I named my specimens of hamama at the British Museum before I saw the specimens of *Dionysia* at the Kew Herbarium, and that it was I who pointed out to Mr. N. E. Brown afterwards that the Kew Herbarium specimen labelled *D. Kotschyi* was wrongly named, and was really *D. diapensiæfolia*. E. M. HOLMES.

CINCHONA BARK OR QUININE?

Sir,—In the 'Memoirs of the Margravine of Baireuth,' recently translated by H.R.H the Princess Christian, it is stated that quinine was given with benefit in 1740 to the King of Prussia (Frederick the Great), as an antipyretic. According to the best authorities quinine and its sulphate were not discovered till 1820. Would it not have been cinchona which Her Royal Highness has rendered quinine and which at that period (1738) was being investigated by European botanists and other authorities?

WILLIAM ROBERTSON.

[*** There can be no doubt that our correspondent is right in his conjecture and that the royal translator was led into error by the form of the word used in the original to represent cinchona bark.—ED. PHARM. JOURN.]

J. Townsend.—Publications of the kind are now so numerous that we are compelled to remit all notice of them to the advertisement pages.

Protoplasm (who should have sent his name and address).—'Agricultural Chemical Analysis,' by Dr. P. B. Frankland, published by Macmillan and Co.

H. T. B. Young.—We believe not, but apply to the Secretary of the Royal College of Surgeons.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Gerrard, Abraham, Dickson, Kirkby, Leech, Young, Plumbe, Benger, Nicol, Allen.

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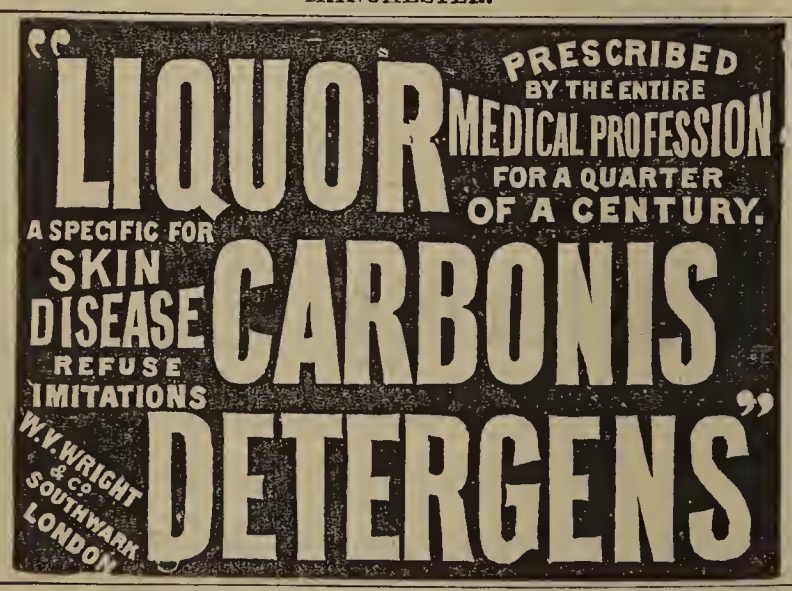

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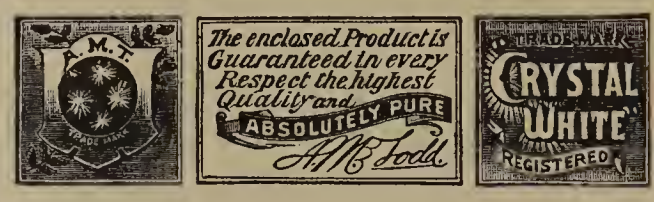

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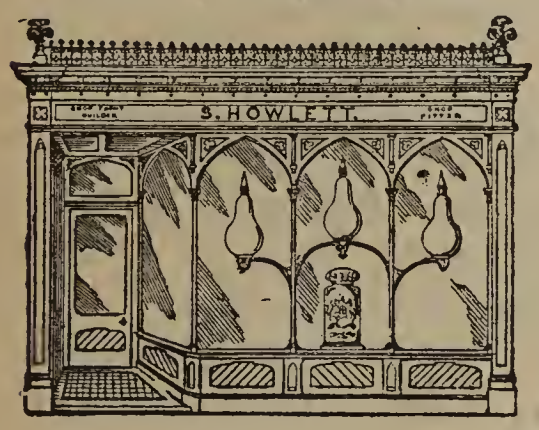

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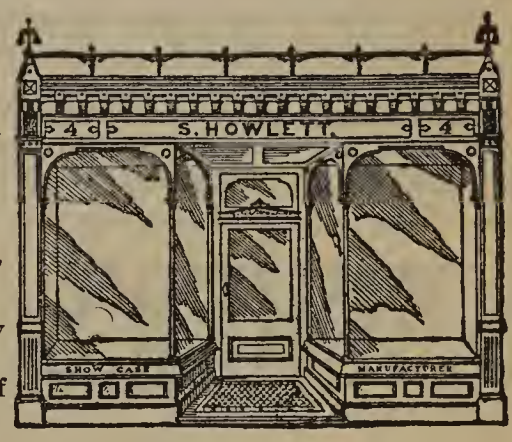

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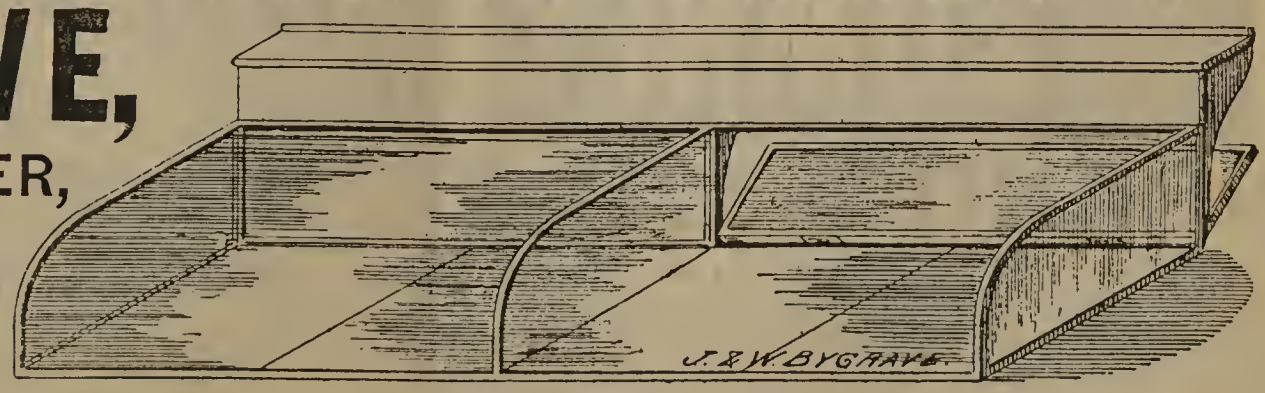

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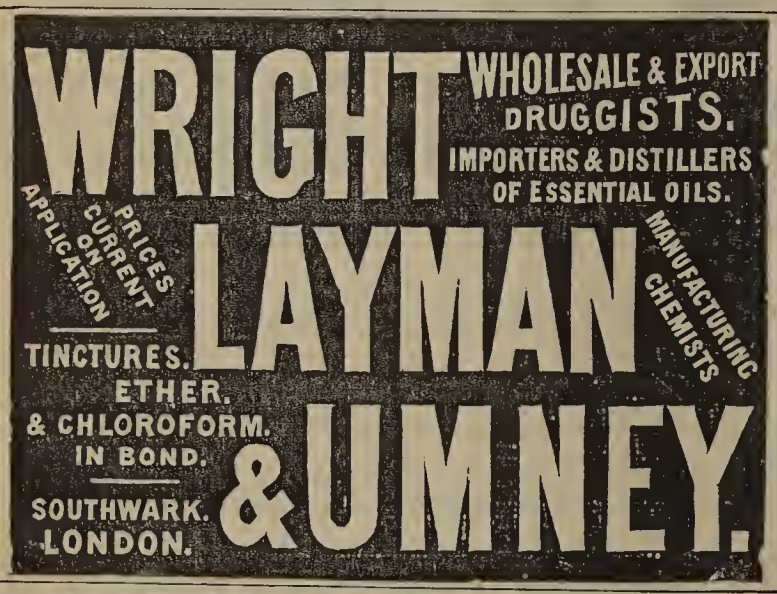

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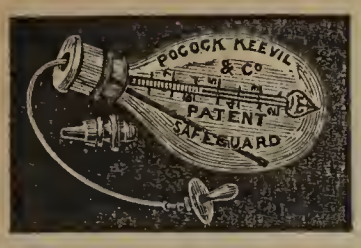

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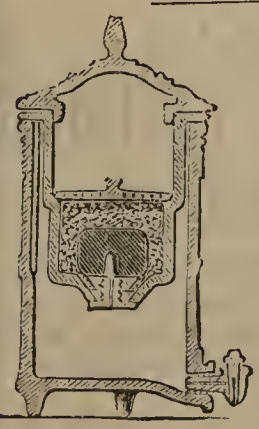

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The WINTER SESSION of 1887-88 will commence on OCTOBER 1, when an Introductory Address will be delivered by R. W. REID, Esq., F.R.C.S., at 3 p.m.

Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

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Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

R. W. REID, Vice-Dean.

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SESSION 1887-88.
Faculties of Arts and Science.

The next SESSION commences on Monday, 3rd October.

No student will be admitted under the age of 16 without having passed a Preliminary Examination.

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LECTURES.

Mechanical Dentistry—Dr. Walker, M.R.C.S., L.D.S., on Wednesdays, at 5 P.M., commencing on October 5th.

Metallurgy in its Application to Dental Purposes—Professor A. K. Huntington, F.C.S., on Tuesdays, at 12 A.M., commencing October 4th.

The SUMMER SESSION will commence in May, 1888.

Dental Surgery and Pathology—Mr. S. J. Hutchinson, M.R.C.S., L.D.S., on Tuesdays and Fridays, at 8 A.M.

Dental Anatomy and Physiology (Human and Comparative)—Mr. Arthur Underwood, M.R.C.S., L.D.S., on Wednesdays and Saturdays, at 8 A.M.

General fee for Special Lectures required by the curriculum, £15 15s.

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Monday, 9 A.M.	Mr. D. Hepburn	L. Matheson.
Tuesday ,,	Mr. R. Woodhouse	Mr. W. Hern.
Wednesday ,,	Mr. Gregson	Mr. E. Lloyd Williams.
Thursday ,,	Mr. Storer Bennett	Mr. G. Parkinson.
Friday ,,	Mr. Claude Rogers	Mr. L. Read.
Saturday ,,	Mr. F. Canton	Mr. Truman.

Anæsthesists—Mr. Braine, Mr. Bailey, Mr. Bird, Mr. Mills.
Assistant-Anæsthesists—Dr. D. W. Buxton, Dr. F. Hewitt.
Medical Tutor—Mr. W. B. Paterson.
Demonstrators—Mr. E. Latchmore; Mr. W. R. Ackland.
House-Surgeon—Mr. H. Williams.
Assistant House-Surgeons—Mr. T. F. Colyer; Mr. George Seymour.

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Further particulars may be obtained on application to the Dean, at the Hospital, where he will attend in the afternoons from September 26th to October 1st inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.

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WINTER SESSION, 1887-88.

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Full particulars may be obtained from the Honorary Secretary of the Medical School, Dr. J. GALLEY BLACKLEY, who will attend at the Hospital on Mondays and Thursdays, from 2.30 to 4.30 p.m., for the purpose of giving information to intending Students.

G. A. CROSS,
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2. Regulations regarding the Licence.
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Assistant Physician—Dr. James Anderson.
Surgeons—Mr. Couper, Mr. Rivington, Mr. Waren Tay, Mr. McCarthy, Mr. Frederick Treves.
Assistant-Surgeons — Mr. Reeves, Mr. C. Mansell Moullin, Mr. Hurry Fenwick, Mr. F. S. Eve.
Obstetric Physician—Dr. Herman.
Assistant Obstetric Physician—Dr. Lewers.
Ophthalmic Surgeons—Mr. Waren Tay, Mr. F. S. Eve.
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Practical Anatomy—Mr. Mansell Moullin.
Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Chemical Physics—Mr. F. J. M. Page.
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Anatomy and Pathology of the Teeth—Mr. Barrett.
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Emeritus Professor of Surgery—Mr. Jonathan Hutchinson, F.R.S.

The SESSION 1887-88 will commence on Saturday, October 1st, 1887. The New Buildings, which were opened by their Royal Highnesses the Prince and Princess of Wales on May 21st, afford more than double the accommodation which was provided formerly.

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IN Wholesale house by advertiser, with many years' experience of drugs, &c. W. T. D., 6, Springfield Villas, New Southgate, N.

AS Assistant. Disengaged. Age 28. Height 5ft. 10in. 12 years' experience in Prescribing, Dispensing, and light Retail. Could manage Branch. G., 69, Lambeth Rd., S.E.

MANAGER or Dispenser. Age 32. Married. Minor qualification. Registered Dentist. Disengaged. D., Beulah Cottage, Glenthorne Rd., New Scuthgate.

MANAGER. Out-door preferred. Qualified. Age 26. Dispenser, 101, Western Rd., Brighton.

AS Junior Assistant. 4 years' experience. Disengaged beginning of October. Excellent reference. F. Fairbairn, 160, High St., Southampton.

MANAGER or Senior. Age 30. Major qualification. Major, 71, Wilmslow Rd., Didsbury, Manchester.

AS Chemist's Assistant, or Surgeon's Dispenser. Out-doors preferred. Moderate hours. Age 24. 8 years' experience. Good references. H. C., Scofton Cottage, near Worksop.

OCTOBER.—As Junior, in good Dispensing house. T. A., 1, King's College Rd., N.W.

AS Assistant in London. Time for study desired. Age 22. Well recommended. J. J., Cambrian House, Chipping Sodbury, Gloucestershire.

LOCUM Tenens. Professional. Major Qualifications. Postal address, Frank Chabôt, 7, Elm Vale, Fairfield, Liverpool.

JUNIOR. Age 21. 4½ years' experience. Height 5ft. 8in. Good references. Particulars to J. A. Sargent, Gospelgate, Louth.

ASSISTANT in good Provincial business. Minor. Age 23. Good London experience. H. Kerr, Manor Farm, Thurlton, Norfolk.

ASSISTANT. First-class experience. Good references. Age 28. Height 5ft. 9in. H., 57, City Rd., Bristol.

AS Junior, in a large town where there would be an opportunity of attending evening lectures. 5½ years' experience. Highest reference. Height 5ft. 9in. Alpha, 2, Market St., Loughton, Staffs.

AS Assistant, Manager, or Dispenser for Medical man. Good appearance and references. F. Higgs, Bartholomew St., Newbury.

MANAGER of branch, or Assistant. 25. Married. Good Prescriber and Teeth Extractor. Frith, 79, Grosvenor St., Cheetham St., Manchester.

IMPROVER. 2 years' Dispensing, and 1 year in good Chemist's shop. Particulars, A. M., Trafalgar Villa, Stratton, Cirencester.

ENGAGEMENTS WANTED.

MANAGER, by a thoroughly experienced man, in town and country trade. Age 34. Single. Qualified. Good Prescriber. M., G. Goldfinch, Chemist, Hendon. London, N.W.

IN London. 9 years' good class town and country experience. Disengaged October 13. EXTRACTOR, 18, High St., Leicester.

JUNIOR ASSISTANT. London. Age 20. 4 years' experience. Excellent references. WILLIAMS, 3, Market Sq., Hanley, Staffs.

JUNIOR or IMPROVER. 4 years in first-class Pharmacy. Age 18½. Height 5ft. 6in. Large town preferred. Disengaged. Abstainer. Passed Prelim. COCAINE, Mr. Warman, Watton, S. O., Norfolk.

ASSISTANT or DISPENSER. Minor. Age 23. 7½ years' experience. Excellent references. Out-door preferred. S. P., 4, Harlaxton St., Woodboro Rd., Nottingham.

OUT of the house. Short time allowed for study. Moderate salary. Good references. E. PORTER, 43, Tennison St., York Rd., Lambeth.

MANAGER or LOCUM TENENS. Qualified. Aged 40. P. C., 7, Priory Rd., Warwick.

JUNIOR. Age 20. Height 6ft. 4 years' experience. T. ALLIN, Ibotsworthy.

IN Ireland. Age 26. Experienced. First-class references. CHEMICUS, 24, Westwell St., Plymouth.

JUNIOR. Age 23. 8 years' experience. CHEMICUS, Rotunda Buildings, Cardiff.

MANAGER. Age 28. Qualified. W. H., 6, Farringdon Villas, Whitestyle Rd., Brentford.

JUNIOR. 4½ years' Mixed Country experience. Age 19. T. BURRELL, High St., Horncastle.

ASSISTANT or DISPENSER. Age 27. Disengaged STATIM, 2, Albert St., Merthyr Tydfil.

ASSISTANT. Age 25. Good references. Disengaged. MINOR, 47, Market St., Farnworth, Bolton.

JUNIOR. 5 years' experience. Passed Prelim. ELLIS, 98, Calverley Rd., Tunbridge Wells.

EVENING employment wanted. Letter. LAC, 186, St. John St., E.C.

AS MANAGER in a good class business in London or good provincial town. Minor. First-class experience. A. M., Rock Cottage, Nant. Bersham, Wrexham.

AS ASSISTANT. Age 24. Height 5ft. 10in. 9 years' experience. Good references. A. CLARKE, The Pharmacy, Teddington, S.W.

DISPENSING experience required by SPES, 19, Broadway, Crouch End. Engaged during day.

JUNIOR. Town or country. Mixed business preferred. J., 87, Osmaston St., Derby.

JUNIOR. Age 21. Good experience. A. B., 29, Fisherton St., Salisbury.

TEMPORARY.—Disengaged Saturday and Wednesday. W., care of Chemist, 309, New North Rd., N.

ASSISTANT or DISPENSER. Temporary or permanent. Age 23. Good experience. Highest references. Testimonials. CHEMIST, 12, Gibson Sq., Islington.

AS IMPROVER. Has had 2 years' Dispensing. Good references. T., Printing Office, Stow-on-the-Wold.

AS out-door ASSISTANT or MANAGER of branch. 12 years' London and Provincial experience. Knowledge of Dentistry. Aged 27. Height 5ft. 8in. Married. Exceptional references. OMEGA, 89, Bucknall New Rd., Hanley.

EVENING EMPLOYMENT wanted. Disengaged after 6. Minor. ROLAND, 51, Hackford Rd., Brixton.

ENGAGEMENTS WANTED.

DRUG TRAVELLER seeks re-engagement. 9 years' over the West of England and South Wales, also Channel Islands. ALPHA, 39, Saltoun Rd., Brixton, London.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

EARLY in October. A competent ASSISTANT. Indoors. Age about 24. Accustomed to good Country business. Hours, 8.30 a.m. to 9 p.m. No Sunday duty. Full particulars to GARRETT BROS., Newport, Mon.

SENIOR ASSISTANT. Qualified preferred, and of good experience. Send carte. HUGHES & WYATT, Stourbridge.

NEIGHBOURHOOD of London. Early in October. An experienced ASSISTANT, age not under 24, accustomed to good Dispensing and light Retail. Send full particulars, and, if convenient, photograph (which will be returned), to W. L., care of Messrs. W. W. Flood & Co., 102, Blackman St., London, S.E.

AN ASSISTANT. Good Salesman and Prescriber indispensable. Salary (outdoor) £72 per annum. Address, J. ROBERTS, Chemist, Newcastle-on-Tyne. Testimonials and C. D. V. (if convenient) must accompany each application.

NEAR town, an ASSISTANT of active business habits, in light Retail and Dispensing and Prescribing business. Apply stating age, height, and salary required, W. J., Messrs. Megesson & Co., Miles Lane.

JAGG & CO., 127, Buckingham Palace Rd., S.W., require an ASSISTANT, who would have to Dispense at a Public Institution a few hours daily. Sleeping and sitting room provided, without board.

APPRENTICE.—H. J. BROUGH, Pharmaceutical Chemist, has a vacancy for a respectable youth, as in-door Apprentice. Thorough personal instruction and every home comfort. Premium required. 7, Netherwood Rd., West Kensington Park, W.

A TRUSTWORTHY ASSISTANT, of good moral character, not under 25, in a light retail and dispensing business, in-doors. One who can Prescribe and extract teeth, and an abstainer preferred. Apply, with full particulars, C. T., Messrs. Edwards & Son, Queen Victoria St.

APPRENTICE. Well-educated youth, in good-class Retail and Dispensing business in North of London. Moderate premium required. 3 or 4 years. E. J. MUNRO, 98, Seven Sisters Rd., Holloway.

OCT. 10.—Competent ASSISTANT. In-doors. Two kept. Apply, stating full particulars and references to H. HYETT, Bailgate, Lincoln.

EARLY in October. A gentlemanly ASSISTANT. Accustomed to good-class trade. Enclose carte, which shall be returned. P. H. MORGAN, 1, Nelson Ter., Southend-on-sea.

ASSISTANT wanted. Out-door. Age about 22. Must be used to a good Dispensing business HITCHCOCK & SONS, Oxford.

EXETER.—Good ASSISTANT wanted. Retail and Dispensing business. Must be sharp and up to his work. State age and salary required, enclosing references and photo, if possible, to EXETER, care of Barclay & Sons, 95, Farringdon St.

ASSISTANTS WANTED.

JUNIOR Assistant for Counter. Must be a good Salesman. Apply, by letter only, giving full particulars, to B. S., 24, Queen Victoria St., E.C.

EARLY in October. Assistant, about 22, who has been accustomed to Mixed Country business. Must be active, gentlemanly, and obliging. Comfortable home and time for study. State height, experience, and salary required, and enclose photo (if convenient), to A. M., care of Mr. Francis, 5, Coleman St.

JUNIOR Assistant. One accustomed to a Dispensing and Family business. Apply, stating age, height, and experience, with references, to H. Wyatt, 223, Stanley Rd., Bootle-cum-Linacre, Liverpool.

AN active Junior (out-door). Prospects good to one requiring a permanent situation. A knowledge of Homœopathy not essential. Apply to J. C. Pottage, Homœopathic Chemist, 117, Princes St., Edinburgh.

A VACANCY occurs in a Wholesale Drug business for a gentleman of good address and thorough business habits. A liberal salary with prospective advantages given to an active and energetic man. M.P.S. preferred. Address, giving antecedents, Fides, 27, Great Russell St., W.C.

JUNIOR. London experience and good appearance. Personal application preferred. 1, King's College Rd., South Hampstead, N.W.

ABOUT the commencement of October, an experienced and well recommended in-door Assistant wanted. Must be over 23 years of age. Apply or write, with full particulars, to Mr. Beere, 23, Hampstead Rd., N.W.

APPRENTICE.—A Pharmaceutical Chemist (Bell Scholar, Double Medallist and Prizeman of the Pharmaceutical Society) is in immediate want of a well educated youth, 16 years of age. During the third and fourth years he would be allowed to attend the lectures of the School of the Pharmaceutical Society. A comfortable Christian home offered. Premium 80 guineas for 4 years, or 100 for a 3 years' term. Pharmacist, care of John Moss & Co., Galen Works, Deptford.

JUNIOR, experienced, for Branch (where time for study can be obtained if desired). Must be strictly steady, trustworthy and attentive. Address with particulars of experience, references, salary required, and when disengaged, to Statim, Sanger & Sons, 489, Oxford St., London, W.

JUNIOR or Improver, September 30th, where four are kept. In-doors. State age, height (and enclose photo, to be returned), salary required, half a day a week allowed for recreation; Sunday duty every 4th Sunday. Jeans & Co., 1 & 3, Broad St., Pendleton, Manchester.

JUNIOR to Dispense and attend Small Retail (Surgeon's). State salary. Apply by letter. A. F., 2, Marquis Rd., N.W.

INVOICE Clerk. Indoor. Apply with full particulars as to experience, references, &c., to Brady & Martin, Newcastle-on-Tyne.

EARLY in October. An energetic, experienced, and trustworthy Assistant required, of good address, with a knowledge of Surgical (not Mechanical) Dentistry preferred. Out-doors. Permanency. No Sunday duty. State age, references, experience, and salary required to J. G. Plumley, Bristol Bridge, Bristol.

IMMEDIATELY. Active Junior. 22 to 24 years of age, for Light Retail. Indoors. Abstainer preferred. Also, about 30th inst., temporary for 3 weeks. State height, references and salary required in each case. Enclose carte, if convenient. Will be returned. Apply, R. E. Naish, St. Albans House, Weymouth.

ASSISTANTS WANTED.

TRAVELLER. Wanted, by a firm of Wholesale Druggists in North of England, a town traveller. None but gentlemen of experience and with good influence need apply. Applicants will please state age, and salary required. Address Traveller, care of Lee & Nightingale, Advertising Agents, Liverpool.

HORTON & Co., The Torbay Pharmacy, Torquay, require a qualified Assistant. He must be a rapid and careful Dispenser. Member of some Christian church preferred. Applicants will kindly give full particulars in first instance, and enclose carte.

A COMPETENT Assistant for general Retail, with Dispensing and Prescribing. Minor qualification desirable. State age, experience, reference, and salary required, enclosing photo. H. T. Netten, Chemist and Dentist, Manor St., Stonehouse, Devon.

IMMEDIATELY, Assistant in first-class Retail and Dispensing business, N.W. State height, age, and salary required, also references; personal application preferred. Major, Messrs. Huskisson & Co., Swinton St., W.C.

AT once. Thoroughly good Assistant (both at Counter and Dispensing Department) as Senior in good Provincial business. Minor. Aged about 26. Applications, with full particulars, enclose carte, references, and experience. Send at once, to W. E. Everett, St. Botolph's Pharmacy, Colchester.

AT once, Junior, not under 20, for good class Dispensing business in Manchester. Time allowed for study. State age, height, references, and salary required, to Chemist, care of Mr. Hope, 10, Duke St., Greenheys, Manchester.

IMMEDIATE.—A Junior Assistant. Active, accurate Dispenser. Member of a Christian Church. Abstainer. Apply, with carte, to be returned, stating age, height, salary, and references, to Griffith, Chemist, Weston-super-Mare.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

IN a popular watering place. Best position in the town. Handsome shop; well fitted and good profits. Several valuable proprietaries attached. Full prices for patents. Average returns for the last 6 years £1000 per annum. Principals only treated with. Apply to Ayrton & Saunders, 149, Duke St., Liverpool.

THE old established Business of Messrs. Young & Postans in Baker St. Particulars may be had of Messrs. Furber, Price & Furber, Warwick Court, Gray's Inn.

SUFFOLK.—An old established ready money Retail and Prescribing Business, carried on by the present proprietor 30 years. Returns over £1000. Large house. Rent £85, which may be made by letting if desired. No agents need apply. For particulars, Messrs. Hodgkinsons, Treacher & Clarke, 198, Upper Whitecross St., London, E.C.

BARGAIN to an immediate purchaser. Old established Prescribing, Retail, Dispensing and ready-money Business. Returns £500. Price £350. Well stocked shop. Double fronted, plate glass. Good 10 roomed house in main street, with 3 entrances. Much frequented seaport, market town in Kent. Particulars, Callow House, Fulham Rd., London.

BUSINESSES FOR DISPOSAL.

SOUTH Coast.—Light Retail and Dispensing Business. Good neighbourhood. House contains 6 bedrooms, and 2 sitting rooms, &c. On lease. Rent £35. Returns £480. Price, including book debts, £425. C. B., care of Wright, Layman & Umney, 50, Southwark St., London.

IN consequence of the owner going abroad, 2 good Businesses for sale, close to Epping Forest. Shops well-stocked and in first-class positions. Same hands many years. Price £1400 cash the two. Good opening for a Dentist. Full particulars from J. Robins, Woodford, Essex.

A CHEMIST'S Business in thickly populated district of North Staffordshire. Average weekly returns £14 10s. Shop well-stocked and fitted. Rent £32 per annum. Price £500. Apply C. T., Messrs. Evans, Son & Co., 56, Hanover St., Liverpool.

SURREY. — Old-established cash Retail and Prescribing Business. Main road, centre of a thickly populated market neighbourhood. No opposition. Genuine stock. Opening for Dentistry. Open to investigation. Introduction given. Satisfactory reason for disposal. Net profit £175 year. Rent (on lease) £50. Price £340. Chemist, 106, Birchanger Rd., South Norwood.

PARTNER wanted, in a thoroughly good class old country Retail. Midlands. Amount of cash invested not necessarily large, the chief object being to have a really reliable man, accustomed to this class of trade, who would well interest himself in it. Partner, care of Mr. Brett, Valuer, 60, St. Stephen's Rd., Leicester.

SOUTH West of England. Good Market town, with a very large neighbourhood, only one other Chemist. A Light Retail and Dispensing Business. Returns £900 (profits good). Price £800. The shop is handsomely fitted and well stocked. Address, H. G., care of Messrs. May, Roberts & Co., 9, Clerkenwell Rd., E.C.

£1700. FIRST-CLASS Dispensing and Light Retail Business. Returning £1800. Elegantly fitted. Heavily stocked. Producing a net profit of about £600 per annum. Gentlemen having the cash desirous of investing in a reliable concern apply by letter to Major, care of Mr. Snelling, 296, Old Kent Rd., London, S.E.

IN S.W. District. A light Retail Dispensing and Prescribing Business. Returns over £500 under management. House contains 10 rooms. Rent £60. Price £250. Apply to Berdoe & Co., 30, Jewry St., Aldgate, City.

FIRST-class old-established Business in a market town. Very good position. Death of proprietor cause of disposal. Splendid chance for an enterprising man. Lease, large well-fitted shop. Capital fixtures; premises in good repair. For further particulars, apply to Mrs. Dunn, 4, Fore St., St. Austell.

£170. Good Prescribing and Dispensing Business, in a thickly populated part. Rent £30. Agency, which pays rent. Owner taking larger business. Returns £400. The price is at a great reduction, and is well worth consideration, as it must be sold. Apply, Thompson, Southbridge Rd., Croydon.

A GENUINE light Retail and Dispensing Business. West of England. Proprietor retiring. Address, Phlox, care of Wright, Layman & Umney, 50, Southwark St., S.E.

IN consequence of the death of the proprietor, a small Business to be disposed of in the W. C. district. A good and improving thoroughfare. Terms low. Apply, T. M., 105, London Wall, E.C.

WELL-FITTED and Stocked shop in populous district. Centre of market. Takings last year £350. Price £250, or good offer. Apply, A. B., Messrs. Baiss Bros & Co., Jewry St., Aldgate.

BUSINESSES WANTED.

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N.B.—Postage Stamps cannot be received in payment.

IN a thriving Midland town or large village, a Business where Dentistry could be added, requiring £400 cash ready, or Partnership. Address, Chemist, Duke St., Stourbridge.

A GENUINE good class Dispensing and Retail Business. Price £400 to £500. Must be in good neighbourhood and bear strictest investigation. Address, with full particulars, Antipyrin, 62, Frenchwood St., Preston, Lancashire.

A CHEMIST'S Business at a bracing sea-side place, or shop to open as same facing the sea. Good house and moderate rental indispensable. Send particulars to F. Shirtliff, 72, Archway Rd., London, N.

A GENUINE old-established Chemist's Business, within 50 miles of London preferred. Returns about £800. No agents. Full particulars in strictest confidence, Alpha, 5, Wyndham St., Bryanston Sq., W.

A LIGHT Retail and Dispensing Business. Returns from £400 to £700. Send full particulars and lowest price for cash, to Mr. Pearson, 12, Alexandra Ter., Clifford Rd., Norwood Junction, Surrey.

A GENUINE Business, no objection to a low class trade, or a partnership would be entertained. Advertiser is both a Mechanical and Surgeon-Dentist. Address, with full particulars, Drugs, care of Messrs. Baiss Bros., Jewry St., Aldgate.

A LIGHT Retail, Dispensing and Prescribing Business, in main road preferred, North or North West of London. Income £600 to £800. Good residence desirable. Full particulars, rent, taxes, profits, to S. D. Pearce, Dispensary, Charing Cross Hospital, London. No agents.

A GOOD class Retail and Dispensing Business. Returns from £1200 to £1800. Send particulars and state what house accommodation, to Mr. Bush, 19, Lansdowne St., Hove, Brighton.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

Midlands.—High class Retail and Dispensing. Returns £1350, at good profits. Price £1300. Moderate rental. Particulars on enclosing wholesale reference.

Home County.—Light Retail and Dispensing. Returns £800, at full prices. Price £750.

London, W.—First-class Dispensing. Returns £1500. Price £1300. Excellent opening for Dentist.

London, N.W.—Retail and Dispensing, in good position. Returns £700. Price £600.

London, N.—Dispensing and Prescribing. Very profitable. Returns £700. Price £650. Good house.

London, S.W.—Retail and Prescribing. Returns £400, giving good profits. Price £300.

PIANO.—Gentleman going abroad shortly offers for immediate sale magnificent 60 guinea Iron Overstrung Upright Grand (cottage shape). Rich burr walnut case, combines every modern improvement, 7 octaves, trichord throughout, patent check-repeater action, tone of exceptional power and brilliancy, faultless condition. New only 6 months ago. Accept 26 guineas, and transfer makers' 12 years' guarantee. Will send on trial, and pay return carriage if disapproved. Bennett, 363, Clapham Rd., S.W.

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VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Probate and Fire Insurance valuations.

WALES, S.—Good class light RETAIL. Returns £800. Price £550. Fine scope for pushing man.

SUFFOLK.—Light Retail, Dispensing and PRESCRIBING. No heavy trade. Returns, at good prices, about £800. Price £750, value of stock and fixtures.

BIRMINGHAM.—Dispensing and light RETAIL, in good position. Returns £600. Increasing. Price £550, or fair offer.

NOTTINGHAM.—BUSINESS, under disadvantages returning £500. Can be doubled. Valuation £400. £100 cash, and the balance as arranged.

LINCOLNSHIRE.—Good class country RETAIL. Returns about £700. Valuation £600. Could be doubled by addition of heavy trade.

WALES, CENTRAL.—Death vacancy. Well connected good class RETAIL, &c. Returning on an average £1200 per annum, and capable of increase. Valuation about £800, part of which might be arranged.

LONDON, W.—Nice Branch RETAIL. Returning £500. Price £250.

Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

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Valuers, Transfer Agents & Auctioneers
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Established 1870.

SOMERSET.—Good class BUSINESS. Returns £1400. Net profit £480. Price £1200. Part remain.

MIDLANDS.—Death vacancy. Returns £800. Same hands 20 years. Good house. Price £650.

30 MILES OUT.—Market town. Retail and PRESCRIBING. Returns £600. Net profit £225. Price £425.

SURREY.—Retail and DISPENSING. Returns £500. Rent £30. Good house; garden. Only £300.

LONDON, S.W.—Retail and PRESCRIBING. Returns £500 by manager. Price £225, or offer.

S.E.—Main road. Net profit £300. Same hands 12 years. Price £650.

Others from £100 to £4000, free on application..

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Strengthening, Sustaining, Tonic, and Restorative. Opinions of the leading Medical Journals and Scientific press, together with samples, sent post free, or may be obtained on application.

Price 1s., 1s. 9d., 3s., and 6s. Prepared only by

THE INTERNATIONAL PATENTS ASSOCIATION,
15, Nicholas Lane, London, E.C.

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CALLING upon Chemists, Druggists, and Drysalters in the South, West and Midland Counties, can hear of a good Agency, entailing few samples or labour, by writing to X. Y. Z., 54, Aldermanbury, E.C.

ALMANACS, 1888.—Publishers of Almanacs having Advertisement Spaces to Let are requested to send sample almanac and best terms to G. M., care of Barclay & Sons, 95, Farringdon St., E.C.

CHEMISTS' TRANSFERS.
32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer:—

1. LONDON, N.—Death vacancy. Good class BUSINESS, Retail and Dispensing. Returns nearly £500; has been much neglected. Commanding corner position. Handsomely fitted shop, and good stock. Large and convenient house. Reasonable offer will be considered, or valuation terms can be arranged.
2. LONDON, S.E.—Cash Retail and PRESCRIBING, with Dispensing, situate in a good business locality. Returns about £450, with good profits. Large and convenient house. Moderate rent. Long garden. Price £350. One month's trial allowed if wished.
3. LONDON, N.—Dispensing, Prescribing and light Retail BUSINESS, situate in main street. Returns last year £660, increasing. Shop well-fitted in mahogany, and good stock. Price about £635.
4. SOUTH DEVON.—Unopposed country BUSINESS of good class. Returns under management nearly £500 yearly. Capable of being much increased. Good house, garden, &c. Price £300.
5. WARWICKSHIRE —Good position. Retail and Dispensing and Prescribing BUSINESS. Returns over £600 yearly. Net profits over £220 yearly. Shop well-fitted, and good stock. About £550 required.
6. SOUTH COAST.—Fashionable town. First-class BUSINESS for disposal, situate in main street. Returns nearly £2000 yearly. Good house, &c. Beneficial lease attached. About £1600 required.
7. NORFOLK.—Good class BUSINESS. Returns £1200. Very profitable. Large shop, well fitted, and good stock. Good roomy dwelling house. Open to every investigation. Valuation terms can be arranged.

WANTED.

WANTED.—Partnerships or first-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly. Cash ready.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.
32, Ludgate Hill, E.C.

Photo-Micrographs.

WELL-KNOWN EMULSIONS AND KEPLER'S SOLUTION of COD LIVER OIL.*

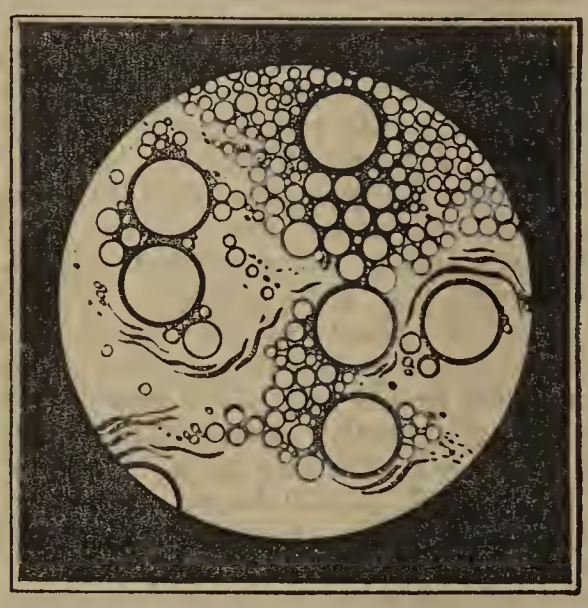
(MAGNIFIED 400 DIAMETERS.)

"It has recently been discovered by Kepler that cod liver oil is capable of being taken into solution."—BRITISH MEDICAL JOURNAL.

Cod liver oil alone often deranges the digestive organs and sometimes causes vomiting and diarrhœa.

A WELL-KNOWN EMULSION OF COD LIVER OIL.

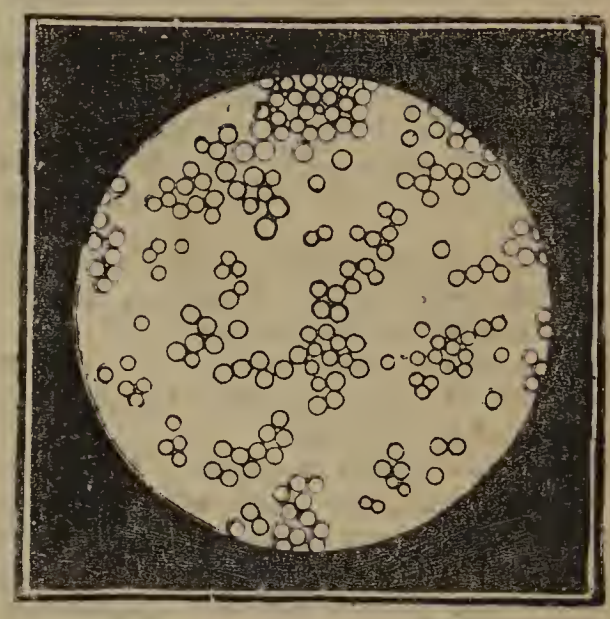
This plate represents the appearance of a well-known emulsion of the market. The segments show how slightly the oil has been affected. What possible value can there be in such an emulsion?



THE EMULSION OF COD LIVER OIL AND MILK IN THE MARKET.

The manufacturers *claim* that the preparation which this plate represents is the most finely divided *emulsion* of cod liver oil in the market. Inasmuch as the small circles depict the milk globules, the size of the others indicates very plainly the indigestible condition of the cod liver oil. Moreover, separation characteristically takes place in this emulsion. The milk is unstable, and preserved with sugar.

The two foregoing, though representative emulsions, are clearly among the most indigestible of foods, while the following are of an entirely opposite nature—easy to digest and highly assimilable.



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These tiny rings show the microscopical appearances of a specimen of fresh pure milk. The fat in milk is in a most digestible form, for it is borne by the most delicate of infant stomachs. Milk itself is a most assimilable food.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 900.] SATURDAY, SEPTEMBER 24, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 5th, at Eight o'clock.

The chair will be taken at half-past Eight *precisely*, by the President.

The Sessional Prizes and Certificates will be distributed at this Meeting.

An Address to the Students will be delivered by

SIR DYCE DUCKWORTH, M.D., F.R.C.P.,

Treasurer of the Royal College of Physicians, London; Physician to St. Bartholomew's Hospital.

The Hanbury Gold Medal awarded to

WILLIAM DYMOCK, M.R.C.S.,

Brigade-Surgeon, Bombay Army, will also be presented.

All Students and friends, ladies as well as gentlemen, are invited to be present.

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This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

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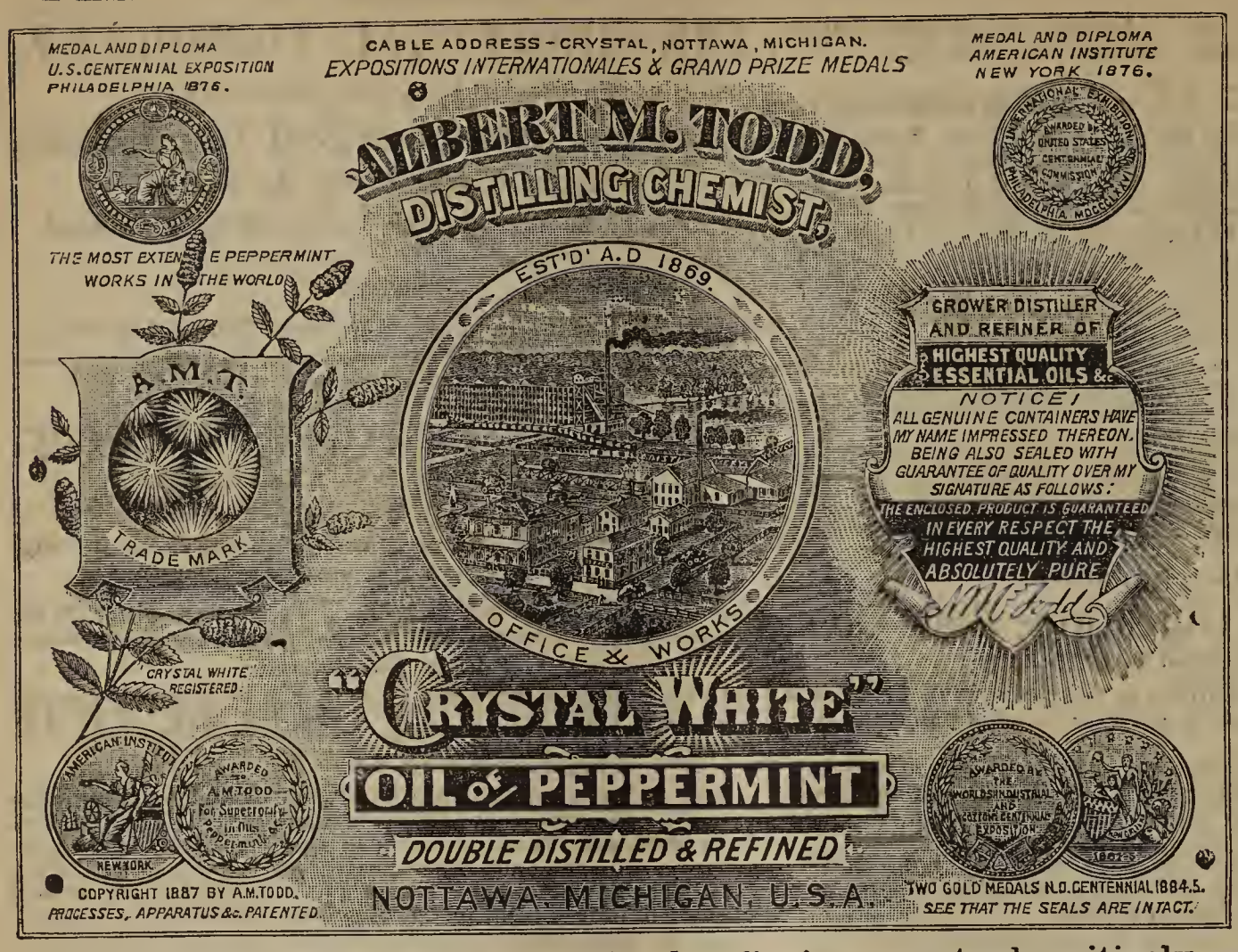

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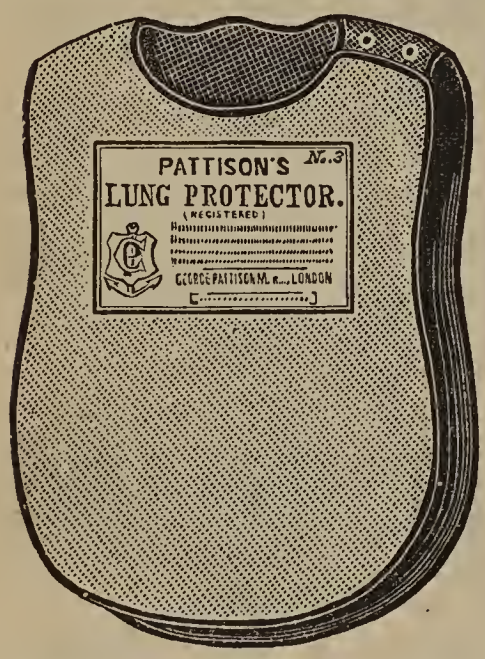

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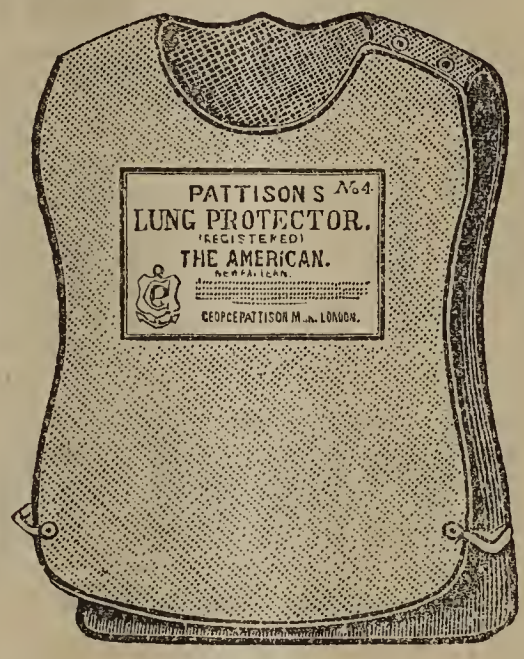

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HYDROQUININE.

BY DR. O. HESSE.

Some years ago de Vrij stated that all commercial quinine contained at least 5 per cent. of cinchonidine sulphate.* But though it had long been known that quinine sulphate might sometimes contain cinchonidine, the above statement was not in accordance with the actual facts of the case, inasmuch as there was also much quinine sulphate brought into the market containing at the utmost only 3 per cent. of cinchonidine sulphate, and sometimes only mere traces of that salt, as was subsequently shown by Cownley.† On the basis of this well-known state of the case I took the liberty of contradicting the statement made by de Vrij, and when he persisted in asserting the accuracy of his statement I also classed it with the statement made by the same authority at the British Pharmaceutical Conference in London (August 5, 1874), according to which the mixed alkaloids of East Indian succirubra bark were represented to have an average rotatory power of $(\alpha)_D = -38°$.‡

De Vrij founded the above-mentioned statement upon the results obtained by the optical method of testing recommended by Oudemans,* without having previously ascertained to what extent the results thus obtained with quinine sulphate are to be trusted. As is well known, that method of testing presupposes the presence of only two alkaloids, quinine and cinchonidine, in the tartrate to be operated upon, and in that case it really gives very satisfactory results. But with commercial quinine sulphate the method is not directly applicable, for the reason that this article contains three or four alkaloids in such amount as to be optically measurable, and besides those already mentioned their hydrides, hydroquinine and hydrocinchonidine. It is true that the amount of hydrocinchonidine in the normal quinine sulphate of commerce, which will bear the test of the German Pharmacopœa II., is almost infinitesimal, and therefore not optically measurable, but in the case of a salt which does not bear that test, or which can scarcely claim to be called quinine sulphate, as for instance "Indian quinine sulphate," the influence of hydrocinchonidine becomes an appreciable factor in the method of testing now referred to.

It is for this reason that even with normal quinine sulphate one observation of the tartrates obtained from it does not suffice, and hence it is necessary to make a further examination of them if a really useful and trustworthy result is to be obtained in this way. I shall subsequently refer more especially to this point after having described the chemical characteristics of hydroquinine.

The alkaloid to which I have given the name hydroquinine was discovered by me§ in the mother liquor from which quinine sulphate had been crystallized, and subsequently also in the commercial sulphate. In order to obtain it from the latter source it is requisite in the first instance to get rid of greater part of the quinine, which may be done by bringing it into combination with an equal molecular proportion of sulphuric acid. The quinine monosulphate may then be separated for the most part by crystallization, and the whole of the hydroquinine salt then remains in the mother liquor. In this way it may be possible to make a quantitative determination of the amount of hydroquinine, and according to my observations commercial quinine sulphate may contain as much as 4 per cent. of the sulphate.

For the purpose of obtaining hydroquinine in considerable quantity and with the least waste of quinine, I operated upon the mother liquor obtained in making the "bisulphate," or quinine monosulphate, by neutralizing it and then converting the neutral salt produced into monosulphate by mixing it with an equal molecular proportion of sulphuric acid. Proceeding in this way a neutral salt was at length obtained, containing upwards of 30 per cent. of hydroquinine sulphate. This mixture was then dissolved with sulphuric acid and the quinine got rid of by means of potassium permanganate. From the clear filtered solution hydroquinine was precipitated by caustic soda and extracted by shaking with ether, benzene or chloroform. From any one of these solvents it was taken up by dilute sulphuric acid and after neutralizing, the sulphate was recrystallized from boiling water until sufficiently pure.

The alkaloid precipitated from a cold solution of the salt by caustic soda is at first amorphous and gradually becomes crystalline. In the latter condition it contains combined water, the amount of which was found to be from 7·75 to 9·79 per cent., corresponding nearly with that required by the formula $C_{20}H_{26}N_2O_2+2H_2O$ which is 9·94 per cent. At a temperature of 115° C. this water is given off and the alkaloid shrinks up. On evaporating a chloroform solution of the alkaloid it crystallizes in concentric groups of needles which do not show signs of incipient fusion at 115° C. In both cases its composition is then represented by the formula $C_{20}H_{26}N_2O_2$, as shown by the following results of analysis.

	Calculated.	Found.	
C	73·62	73·92	73·46
H	7·97	7·96	7·96

Hydroquinine dissolves very readily in alcohol, chloroform, ether, benzene, carbon bisulphide, hydrated acetone and solution of ammonia, but not in caustic soda or potash, and very sparingly in water. It crystallizes from ether or chloroform in delicate concentric groups of needles, and from dry acetone in elongated laminæ. It melts at 168° C., and acquires a brown colour. It has an alkaline reaction, but does not alter phenolphtalein paper. It tastes bitter and in solution it turns the plane of polarized light to the left. For example, a solution of $p=2·4$ in alcohol of 95 per cent. gave at $t=20$ $(\alpha)_D = -142·2°$, and a solution of the same strength in water containing 40 per cent. by measure of normal hydrochloric acid gave $(\alpha)_D = -227·1°$.

A solution of hydroquinine in excess of dilute sulphuric acid presents the same blue fluorescence as quinine, and it also gives the same intense green colour when mixed with chlorine or bromine water, and then with excess of ammonia; on the contrary it very slowly decolorizes a solution of potassium permanganate. Like quinine hydroquinine combines

* Haaxman's *Nieuw Tijdschrift voor de Pharmacie in Nederland*, 510, 1884; *Pharm. Weekblad*, Feb. 17, 1884.

† *Pharm. Journ.*, February 10, 1884.

‡ In the *Chemist and Druggist*, May 1, 1886, p. 379, de Vrij has sought to attach a different meaning to his original statement by suggesting that he only intended to convey that these mixed alkaloids had always a polarizing rotation to the left. In reality the case is different, for when de Vrij made the statement in question at the Conference his object was to facilitate the introduction of the mixed alkaloids prepared from East Indian succirubra bark, and to provide a passport for *his quinetum*, but he said nothing then of the fact well known to him that the mixed alkaloids of this bark sometimes behave quite differently.

§ *Berichte d. deutsch. chem. Ges.*, xv., 856.

with the other cinchona alkaloids, with anethol and with acids.

The compound of hydroquinine with cupreine is obtained when equal molecular proportions of the sulphates are dissolved in water with addition of some sulphuric acid and the solution shaken with ether and ammonia. The ether solution when left at rest for a while deposits concentric groups of brilliant glassy needles of the compound, which has a composition represented by the formula—

$$C_{20}H_{26}N_2O_2,C_{19}H_{22}N_2O_2+2H_2O,$$

analysis giving the following results:—

	Calculated.	Found.
Hydroquinine	48·51	47·68
$2H_2O$	5·35	5·83

A compound of hydroquinine and quinidine may be obtained in a similar manner. It crystallizes from ether in delicate needles, and its composition is represented by the formula—

$$C_{20}H_{26}N_2O_2,C_{20}H_{24}N_2O_2+2\tfrac{1}{2}H_2O.$$

A corresponding compound with hydroquinidine may also be obtained. When hydroquinine and cinchonidine are treated together in the same way elongated rhombic prisms are deposited from the ether solution consisting of a compound of hydroquinine and cinchonidine which is anhydrous and very sparingly soluble in pure ether. 0·6 gram of this compound dissolved in 25 c.c. water containing 10 c.c. normal hydrochloric acid gave with $l=220$ and $t=20°$, $\alpha=10·01°$, whence $(\alpha)_D=-189·6°$. Under the same conditions with cinchonidine the result is $(\alpha)_D=-175·9°$, and with hydroquinine it is $(\alpha)_D=-227·1°$, from which data the calculated amount of cinchonidine in the compound would be 73 per cent. and that of hydroquinine 26·7 per cent. These results correspond with the formula—

$$C_{20}H_{26}N_2O_2,3C_{19}H_{22}N_2O,$$

which requires 73 per cent. cinchonidine and 27 per cent. hydroquinine. A corresponding compound of quinine and cinchonidine was obtained by Van der Sleen.* I have described another compound of these alkaloids $C_{20}H_{24}N_2O_2,2C_{19}H_{22}N_2O$. When cinchonidine sulphate is dissolved with at least twice its molecular proportion of hydroquinine sulphate in dilute sulphuric acid and the solution shaken with ammonia and a considerable proportion of ether the compound $C_{20}H_{26}N_2O_2,2C_{19}H_{22}N_2O$, corresponding to that last mentioned, is obtained in fine hexagonal crystals. In a similar manner compounds of hydroquinine with hydrocinchonidine and with homocinchonidine can be obtained, which resemble the corresponding compound of cinchonidine with hydroquinine. I did not, however, succeed in obtaining a compound either with cinchonine or with hydrocinchonine.

When hydroquinine is dissolved in a little hot alcohol with one-fifth its weight of anethol brilliant glassy crystals are obtained on evaporation, apparently of the tetragonal system, which are a compound of hydroquinine with anethol. It dissolves readily in hot alcohol, slightly in cold alcohol, readily in ether, is insoluble in water, and is decomposed at 120° C. into hydroquinine, anethol and water. Its composition is represented by the formula $(C_{20}H_{26}N_2O_2)_2,C_{10}H_{12}O+2H_2O$, corresponding to the compound of anethol and quinine before described.†

Hydroquinine, like quinine, forms three kinds of salts with acids, neutral, acid and super acid. They are generally more soluble than the corresponding quinine salts.

The neutral sulphate $(C_{20}H_{26}N_2O_2)_2,SO_4H_2+6H_2O$ forms short prisms insoluble in ether, readily soluble in hot and cold alcohol and hot water. It requires 348 parts of water at 15° C. for solution. At 100° C. the water of crystallization is given off, and the dried salt gradually absorbs 12 per cent. of water on exposure to moist air. On one occasion only I obtained a salt containing 8 molecules of water. The neutral sulphate diverts the plane of polarized light to the left, but less than quinine sulphate, and more than cinchonidine sulphate. With $p=4$ (anhydrous) $t=15°$, $l=220$ and 4 molecules HCl in water solution I found $\alpha=-17·02°$, whence $(\alpha)_D=-193·4°$. With 2 grams of the anhydrous salt in 25 c.c. water containing 10 c.c. normal hydrochloric acid, so that $p=8$ and $l=220$, I found $\alpha=-32·28$ and $(\alpha)_D=-189·1°$.

On mixing a hot saturated solution of the neutral sulphate with rather more than the calculated proportion of phenol dissolved in water small needles were formed of a compound sparingly soluble in cold water, but more so in boiling water and in alcocohol. The composition is—

$$(C_{20}H_{26}N_2O_2)_2SO_3.C_6H_6O+2H_2O.$$

The acid salt $C_{20}H_{26}N_2O_2,SO_4H_2+3H_2O$ is formed on mixing a solution of the neutral salt with a molecular proportion of sulphuric acid. By slow evaporation the salt crystallizes in long thin needles readily soluble in water and alcohol, sparingly in hot aceton. At 140° C. the dry salt is converted into hydroquinicine sulphate. When a solution of the acid salt is mixed with a further molecular proportion of sulphuric acid a disulphate is formed which can only be obtained in the amorphous condition on evaporating the solution. An alcoholic solution of the salt (4 mol.), when mixed with potassium iodide (2 mol.), and separated from the potassium sulphate precipitate, gives, on addition of alcoholic solution of iodine, a compound, corresponding to herapathite, in fine dichroic laminæ. Hydroquinine hyposulphite $(C_{20}H_{26}N_2O_2)_2S_2O_2H_2+2H_2O$ is formed on mixing hot water solutions of the neutral sulphate and of sodium hyposulphite. It has the form of small prisms, and is very sparingly soluble in water.

The tartrate $(C_{20}H_{26}N_2O_2)_2C_4H_6O_6+2H_2O$ crystallizes in prisms readily soluble in hot water and in alcohol, but very sparingly in cold water, or in solution of Seignette salt. It requires for solution 545 parts water at 17° C. One half of the crystal water is readily given off in the exsiccator, and at 120° C. the salt becomes anhydrous. The salt after efflorescence by exposure to the air will contain one molecule of water, and in polarizing, according to Oudemans' directions, with the concentration B I found $(\alpha)_D=-176·79°$ (not 176·9° as formerly stated). A repetition of the experiment gave 175·91°, the mean being 176·35°. Kerner and Weller found with the same salt 172·81°. The difference may be due to presence of two molecules of water in the salt examined by them.

The chromate $(C_{20}H_{26}N_2O_2)_2CrO_4H_2+6H_2O$ crystallizes in long yellow needles soluble in hot water, sparingly in cold water, and scarcely soluble in chloroform. It gradually becomes dark coloured on exposure to light. Although sensibly more soluble than quinine chromate, it crystallizes out together with that salt, and can only be partially separated from it by boiling with water.

* *De Indische Mercuur*, January 29, 1887.

† *Annalen*, cxxiii., 382.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 24, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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PROPOSED INTERNATIONAL ACTION WITH REGARD TO ADULTERATION.

A FORTNIGHT since mention was made (before, p. 218) that action was being taken in Brussels to secure the carrying out of the decision of the last International Pharmaceutical Congress as to the establishment of an international journal. The decision had its origin in a motion by Dr. van HAMEL ROOS, of Amsterdam, to the effect the Congress should express a wish for the establishment of an "international review" for the dissemination of information respecting the adulteration of food and commercial products and the methods for their detection. This motion was met by an amendment enlarging the scope of the proposed journal to include all the subjects that had been brought under the consideration of the Congress, and the amendment was eventually adopted and remitted to the "commission exécutive permanente du Congrès" to carry out. Whether the tardy movements of "the permanent executive commission" have exhausted Dr. van HAMEL ROOS' patience, or whether he persistently clung to his own views which the Congress declined to endorse, we are unable to say. But as a fact he has just issued the first part of a "Revue Internationale Scientifique et Populaire des Falsifications des Denrées Alimentaires," of which he is himself the Redacteur-en-Chef.

In the preface to this publication Dr. van HAMEL ROOS adverts to the circumstances above mentioned, and specifies the objects which he considers should be kept in view in an undertaking of the nature he contemplated. Through the medium of such a journal it would be possible to caution the public against the various forms of adulteration that are practised and to facilitate intercommunication between public officers of health and chemists; also to contribute towards a greater agreement as to methods of analysis and, if possible, as to the standards to be established in reference to the composition of different articles of food and commercial products. Without seeking to depreciate in any degree the excellent scientific journals already existing in different countries, Dr. van HAMEL ROOS anticipates that an international organ devoted especially to these objects would be of great utility, and from his experience as the editor of the Dutch journal dealing with adulteration of articles of general consumption, he believes that useful results would be ensured if cases of adulteration were made public in a manner easily intelligible, and in such a form that the reports could be reproduced in the European newspapers. For some time past he has been in correspondence with scientific authorities in other countries, and has succeeded in securing the co-operation of many of them in the prosecution of this work. In the first number of the publication the French language is chiefly made use of, but some of the articles are also given in German, and a few shorter notes in English. It is proposed in future to extend this system of polyglot publication of articles.

The first article in the present number gives an account of the measures in force in Spain with reference to the subject of adulteration. It is written by Dr. CARO, a member of the Madrid Royal Academy of Medicine, and it shows that there is already a very comprehensive system in operation in that country for the detection of adulteration of articles of food. The author points out that the progress of science furnishes facilities for the practice of adulteration which are not unfrequently taken advantage of, so as to admit of articles being offered at low prices, and thus establish an unfair competition, if they are not actually injurious. For this reason he contends that a systematic inspection of all alimentary commodities has become a necessity, not only from the point of view of public hygiene, but also as regards the interests of traders, and he regards it as being the duty of every state to maintain such inspection for the purpose of furnishing a guarantee that such commodities are of good quality. In Spain this view of the matter appears to have been long recognized, and the Government of that country has, with more or less success, sought to exercise a supervision in the matter. Provision is made for periodical visits of inspection to the different shops, and the authorities charged with the performance of this duty have power to confiscate or destroy any articles deemed to be unwholesome, as well as to impose fines on persons in whose establishments such articles are found. The result of this mode of proceeding has, however, been found to be frequently insufficient for the purpose contemplated. In regard to a great many articles of general consumption a daily inspection was considered requisite, and for that purpose subordinate officers were appointed, whose duty was to inspect all articles of food in shops and markets, and to prohibit the sale of such as might be found in a bad condition, or otherwise unfit for consumption. As regards beverages there are in some towns in Spain a different class of officials named *catadores*, whose particular business it is to examine these articles. Latterly it has become more general for municipal authorities to make regulations prohibiting the use of certain colouring agents in the preparation of articles of food as well as operations designed for concealing the bad condition of such articles.

But the result of all these measures was found to be more apparent than real, and it has become evident that without having recourse to the aid of science the authorities are not competent to exercise an effectual supervision, or to prevent adulteration. To secure these objects various legislative measures have been passed, to which it is impossible to refer more particularly in this article. The general result of them has been the establishment of a central department under the direction of the Minister of the Interior, which controls all matters relating to public health. This central office is in direct correspondence with the local authorities appointed by the Government. In the provincial towns the chief magistrates are charged with the administration of the sanitary laws, and in the Communes that duty is entrusted to the alcalde or mayor. In addition to these provisions the services of various public bodies are also engaged, as occasion may require, for the purpose of assisting the Government in a consultative capacity and by furnishing information of a scientific character; these are the Superior Board of Health, the Academies of Medicine, the Provincial Boards of Health, the Municipal Councils, Medical Officers and Inspectors of Medicinal Products. In most of the large towns there have been established by the central authority, at the cost of the municipalities, chemical laboratories where analyses of articles of food are made not only in the public service, but also for any individuals who may require them in regard to any article connected with public health. The municipal councils also make use of these laboratories for any chemical inquiries needed in reference to local matters. These provisions for the protection of the public are, however, confined almost entirely to the more important centres; in the smaller towns little is done beyond carrying out the older system of superficial inspection, which must of necessity be very imperfect in its operation. In a paper read by Dr. Caro at the recent International Hygienic Congress in Vienna he proposed that chemical laboratories should be established in the provinces so as to supply this deficiency, and he suggested that in such instances one of the local pharmacists possessing the requisite proficiency in chemical analysis should be appointed to take charge of the laboratory and carry out the work required.

CONTINENTAL VIEW OF SECRET REMEDIES.

As some of the English medical journals have lately been denouncing the patent medicine stamp tax in a manner that appears to be somewhat inconsistent with the opinion that might be expected in regard to it from a medical point of view, it may not be inappropriate to call attention to the manner in which "patent medicines" are regarded on the Continent. As an illustration of this we may refer to a report that has been presented to the International Hygienic Congress on this subject by Dr. Kratschmer, of Vienna. After discussing the subject at considerable length in this report, the following conclusions were arrived at :—

1. That the secret remedies still made use of, in spite of the legislative measures which have been taken for their suppression, are destitute of any scientific foundation, and being only a means of duping and imposing upon the public and a source of injury to health, the trade in these articles should be regarded as a serious evil to the community, whether considered from a moral, economical, or hygienic point of view.

2. That since the suppression or adequate restriction of the trade in secret remedies cannot be effected by other means, the power of governments should be invoked for the purpose of doing away with the conditions of its existence, by endeavouring to educate and improve the state of public opinion as to matters of hygiene in all classes of society, by introducing suitable measures of pharmaceutical reform and control, by establishing institutions for the scientific examination of articles of food, secret remedies, etc., in regard to their value, and by passing laws to prohibit the advertising, exposure or sale of secret remedies.

We learn from the *Melbourne Herald* that the Pharmacy Board of Victoria has been successful in another suit against a Stores for illegal dispensing. In this case the "Mutual Store" included a department where medicines were supplied, indicated by a glass panel bearing the name of a registered person, which also appeared on the labels. It was shown that there was free access from the medicine counter to the other parts of the store; that change was given by the store cashier, and that receipts for cash were given on forms bearing only the store name. Further, it was admitted by the qualified seller, who was called as a witness, that although he made purchases of drugs payment was made by the store cheque. It was urged, however, that the company was acting within its right in buying parcels of drugs and distributing them to its members. The Court refused to adopt this view, and inflicted two penalties on the defendants, one for carrying on the business of a chemist and druggist, not being qualified, and the other for pretending to be a chemist and druggist.

* * *

At a recent meeting of the Pennsylvania State Pharmaceutical Association a resolution was passed to invite the aid and co-operation of the Pennsylvania Medical Society in promoting the prescribing by physicians of official medicines only, or of such preparations as have published working formulæ, and expressing willingness to receive delegates from the Medical Society at its future meetings. The resolution was brought under the notice of the Medical Society by a deputation and very well received. The subject was referred to a Committee, which reported in favour of the appointment of three delegates to attend the next meeting of the Pharmaceutical Association and also the adoption of measures for the formation of a standing committee on the relationship of medicine to pharmacy. The report was adopted unanimously.

* * *

In the Report of the Postmaster-General, just issued, a curious incident is mentioned as having happened in a Gloucestershire post office. In consequence of a leakage from a tin of "essence of lemon," sent by parcel post, a swarm of bees, "attracted by the syrup," entered the office and settled on the spot where the "essence" had been spilt. Although prompt efforts were made to eject the bees they continued to frequent the office for a fortnight.

British Pharmaceutical Conference.

GENERAL MEETING AT MANCHESTER.

READING OF PAPERS.

Wednesday, August 31.

(*Continued from p.* 252.)

The PRESIDENT took the chair at 10 o'clock.

The first paper read was—

THE FUTURE OF PHARMACY.

BY PROFESSOR LEECH, M.D., F.R.C.P.

When it was suggested by one of your Local Secretaries that I, as Professor of Materia Medica at the Owens College, should read a paper at this Conference, I at first felt some hesitation as to whether any communication I could make would not be somewhat without the scope of the objects of the Conference. For, though I follow with the greatest interest the progress of pharmacy, my own work relates almost entirely to the action of drugs.

A little consideration, however, led me to accept with pleasure the invitation of your Secretary to take part in this Conference, for it seemed to me that it might not be entirely without advantage if I discussed the influence which present and impending changes in medical views and medical practice is likely to have on the future of pharmacy, immediate and remote.

No one can watch the advances and alterations which are taking place in the theory and practice of medicine without being convinced that the work of the pharmacist, so far as it is influenced by its relation to medicine, will in time differ not a little from that which now devolves upon him.

Of the two causes which, it seems to me, will lead to this difference, one is already in operation, and to it I will first allude.

Until a few years ago the form in which medicines were ordered differed but little from those in vogue in Sydenham's time.

Great changes had indeed been made in methods of production and preparations more convenient for dispensing had gradually been introduced, but the authors of our Pharmacopœias never considered it as part of their duty to search after methods by which the discomforts connected with the administration of medicines could be lessened. Practitioners generally did not take much heed of this subject, and pharmacists were content for the most part to do the best they could with the prescriptions of the doctors. But in recent times enterprising men have seen a want and hastened to fill it. Scientific pharmacists have invented better or at least more convenient preparations than those in the Pharmacopœia; they have invented, too, pleasanter forms of administration, and since the production of these new compounds on a large, is easier and cheaper than on a small scale, new commercial industries have arisen which have absorbed some of the work formerly done by individual pharmacists. Not only are the materials, ready for combination, produced on a wholesale scale, but also medicines ready for exhibition in their most convenient form.

Now there are, I think, good grounds for believing that the call on the part of the medical profession for these preparations and medicines is increasing, and will increase, and that this call will distinctly affect pharmacy. The new compounds are welcomed partly because of their convenience, partly because their uniformity of composition is, to a certain extent, guaranteed by the wholesale producer. The present system of education, moreover, leads medical men to prefer ordering medicines which they know are made up in a palatable form, to devising combinations which may not be so pleasant for their patients as they would wish. A large proportion of those on whom powers to practise are conferred have little idea of the best methods of ordering medicines, or of the physical results they may obtain by the association of the drugs they wish to give.

All the examining boards, indeed, require a certificate that the candidates who come before them have attended to practical pharmacy, and these certificates are for the most part obtained from hospital dispensaries or private practitioners.

At dispensaries students, with few exceptions, learn little or nothing, and even the opportunities for acquiring a knowledge of compounding drugs under practitioners who dispense their own medicines have somewhat diminished; for ready-made medicines are usurping the place of the official preparations which used to constitute the surgery stock. Instead of extracts, powders and gums I find, not unfrequently, pearl-coated pills, gelatine capsules and tablets, actual compounding being reduced to a minimum. The increasing variety and pleasantness of these ready-made medicines, the excellence of the combinations presented for use, and the fact that the labour of the practitioner is much lessened by their employment, will doubtless tend to reduce still further the actual compounding of drugs by medical men, and this by lessening the opportunities which students have of learning pharmacy will lead in the future to a still more extensive use of compounds ready prepared for administration.

It is not likely that a return will be made to the old system under which medical students acquired a knowledge of pharmacy. There is, indeed, at the present time much controversy amongst those who have charge of medical education as to the extent to which pharmacy and materia medica should be taught. Already less knowledge of these subjects is required than formerly, and there are some who would banish them altogether from the curriculum. I do not believe that such exclusion will be decided upon. I look forward to the time when students will be taught in well-equipped pharmaceutical laboratories as much concerning the dispensing of drugs as will enable them to prescribe properly for their patients, and when the compounding of medicines by medical men shall cease entirely. Even should this come to pass, the transference of work from the ordinary pharmacist to the wholesale producer will still go on; but should matters remain as they are, or pharmacy be excluded from the curriculum, such transference will go on rapidly.

If, then, the sole office of the pharmacist were to compound drugs, the future of pharmacy could not be regarded as satisfactory. In the end, however, the very increase of the wholesale production of compounded medicines as simple articles of commerce will not take from, but add to the work of the future pharmacist, if he fulfils all the duties which seem to belong to his occupation. Before I show how this may come to pass let me draw attention to another influence which is destined, it seems to me, to powerfully affect the future of pharmacy. I allude to the progress of our knowledge as to the chemistry and the action of drugs.

It was in the early days of medicine, when plants themselves or their juices were looked upon as active medical principles, and before any clear idea had been formed of the manner in which disease is influenced by drugs, that the great majority of the forms our medicines now assume—infusions, tinctures, extracts, and the like—were devised.

The brilliant advances in chemistry at the end of the last and at the beginning of this century led to the discovery that drug-yielding plants contain substances of definite composition, chiefly alkaloids or neutral principles, with which their medicinal properties are intimately connected. But since the effects of these new substances were not quite the same as the drugs from which they were derived, since, too, they were, for the most part, costly, and many of them required to be used with the greatest care, they did not replace the older forms of administering medicine.

Following quickly on the progress in chemical science, came an advance in pharmacology,—that department of science which concerns investigation into the action of drugs on organs and tissues. It might almost be said that from the advances in chemistry pharmacology originated, for scientific accuracy was impossible until principles of definite composition were obtained for experimental purposes.

During the past half century investigations as to the physiological action of drugs have been carried on in almost every country, and never more actively than at present.

So far we have not obtained nearly sufficient knowledge to found thereon a science of therapeutics. The facts discovered by the pharmacologist are at present only aids to the therapeutist; and suggest to him the direction in which he should proceed. But he cannot feel assured of success when he follows the indications given, and it will be long before all the complicated problems which relate to the action of drugs on every tissue are so far worked out as to enable him to feel such assurance.

But pharmacological investigations have made clear many points which are materially influencing the practice of therapeutists; and there are two or three which have an important bearing on the future of pharmacy.

It has been shown that we can never rely on a substance affecting the organs and tissues in a definite manner unless we in the first place make sure that the substance employed is of definite composition; that since extremely minute quantities of many substances will affect tissues in a marked manner, the presence of a second substance even in very small proportion will often greatly modify the action of the first, and sometimes annul it.

The importance of a second point has also been clearly shown. The influence of the amount of the substance used—of dosage—is all important. We cannot influence organs and tissues in a definite and uniform manner if we employ varying quantities of the substance, for different amounts produce not only different effects, but sometimes opposite effects.

Since medicines cure disease by the influence they exert on tissues and organs, it is manifest that what is true in pharmacology must be true also in therapeutics. We cannot in a definite and uniform manner influence a disease process by a substance unless we can be sure that the substance is free from contamination, and unless we have the means of giving it in definite and determined quantities.

Now it is quite certain that we are not able by the use of the large majority of ordinary officinal preparations to administer to our patients definite substances in definite quantities, for these preparations as ordinarily made do not contain definite quantities of active principles. One reason for this is that comparatively slight differences of the menstrua employed lead to great differences in the preparation produced.

Messrs. Dunstan and Ransom recently showed in a paper read before the Pharmaceutical Society that one and the same species of belladonna root can be made to yield extract containing an amount of alkaloid varying from 1¼ to 3 per cent. by merely diluting the alcohol which is used for the percolation of the drug.

But if the utmost possible care were invariably taken to always use menstrua of exactly the same dilution, the strength of the resulting compounds would still differ, since the amount of alkaloids present in the same species of plant grown under different conditions undoubtedly differs considerably. Cultivation makes much difference in the percentage of active principle contained in a plant.

Mr. Gerrard, for example, has shown that the wild belladonna contains more alkaloid than the cultivated. Then, too, the amount of alkaloid present even in wild plants is not always the same. Stenhouse found that broom grown in the shade contained only one-fourth of the amount of spartein contained in plants grown in sunny parts, and the aconite of northern districts is said to be a much more powerful drug than that of the south.

Manifestly the ordinary official preparations used and ordered by medical men are likely to differ most widely in their composition, such difference has in several cases been proved. In twelve commercial specimens, for example, of extract of nux vomica examined by Messrs. Dunstan and Short, the amount of strychnia contained varied from 4 to 8 per cent.

It has been proposed of late, as you know, to remove this difficulty by what has been called standardizing our galenical preparations—that is by making an extract which shall contain a definite amount of the chief alkaloid of a drug and using this extract as the basis of all other preparations of the drug. Undoubtedly by methods such as those suggested in the admirable papers of Messrs. Dunstan, Short and Ransom, we could in the case of nux vomica and belladonna get much nearer than at present to preparations which would give us the power to administer definite amounts of certain principles at will, but in the case of many of our drugs it would be very difficult by any standardizing process to fulfil a second indication which the teachings of pharmacology indicate, not to give definite single or combined substances of definite composition.

A closer chemical investigation of the chemistry of our drugs has revealed the fact that almost all of them contain more than one active principle, and pharmacologists find that these principles have not always similar actions. They at times differ widely and sometimes are absolutely antagonistic. The difference in the effects of the hyoscyamine and atropine found in the belladonna plant on the animal economy is but slight, but strychnine and brucine of nux vomica have by no means a similar action, whilst the methyl conia and conia of *Conium maculatum* differ still more widely, one paralysing the spinal cord and the other the ends of nerves. But the alkaloids of the Calabar bean, physostigmine and calabarine, are, it is said, in many respects absolutely antagonistic, the former paralysing, the latter stimulating the spinal cord. Digitalis contains a substance, digitonin, acting on the heart in an exactly opposite manner to three others, digitoxin, digitalein and digitalin, which it likewise contains, and the jaborandi leaf contains an alkaloid, jaborine, which is directly opposed in most of its physiological effects to two other constituents of the plant, pilocarpin, and pilocarpidine. It usually happens that one alkaloid preponderates and gives the plant or drug its special physiological feature; it seems probable, indeed, that some of the subsidiary alkaloids are produced from the chief alkaloids by some chemical change taking place within the plant. But whether secreted separately or derived there secondarily, these alkaloids vary in their proportion to the preponderating one and are probably at times entirely absent. As yet but little notice has been taken by therapeutists of the possible effects produced by a variation in the relative amounts of two or more alkaloids possessing opposite physiological effects yet present in the same plant, but pharmacologists have found that unless they take care to separate the alkaloids which are yielded by a plant, and use a pure substance they do not get uniform results. Now if we cannot rely on the effects produced by an *uncertain mixture* of alkaloids on organs and tissues, neither can such an admixture be relied on to cause uniform results when employed to influence organs and tissues in the cure of disease. In therapeutics, therefore, as in pharmacology we shall require, in order to be sure of our results, to use alkaloids or definite mixtures of alkaloids in order to get uniform results.

When our therapeutic system is firmly based on pharmacological knowledge one at least of the leading duties of a pharmacist will be to see that the alkaloids or other active principles ordered by the physician are pure, and, if combined, that they are mixed in most exact proportions.

But this is a distant future for pharmacists as well as doctors. Empiricism, guided increasingly, however, by pharmacological knowledge, will long continue to govern our therapeutic procedures, and the time-honoured infusions and decoctions will not yet awhile be replaced by active principles, for the combinations formed by nature in plants are often better than any single substance which we at present know or any artificial mixture of these substances. A time will come when we shall have determined the best combinations and admixtures of the alkaloids for therapeutic use, and then our combinations and admixtures will be more definite than those now provided us by nature in drugs. Meanwhile there will be an increasing call for preparations rendered uniform in composition by minute care in preparation and guaranteed by the vendor.

It is felt by the members of our profession with increasing force that many of the conflicting results recorded by therapeutists, many of the failures met with when successes are expected, are connected with difference in strength in the drug employed. The want of reliance on the uniformity of our present official preparations is leading medical men to employ the preparations of those large houses in America and Germany, as well as in England, who guarantee that their compounds are of a definite strength, and as the profession gets more and more imbued with the teachings of pharmacology, the search after preparations of fixed and definite composition will become more general. *If pharmacy is to hold its own, each pharmacist must be in the future the guarantor of the purities of the medicines he dispenses, not the mere distributor.* The gain to pharmacists which will result from the acceptance of this position will, I believe, more than counterbalance the loss resulting from the transference to other hands of a certain portion of the work formerly devolving on them. Should the position be declined it will be taken up by some other class, and with it may be transferred all other work which requires scientific training. The increased knowledge required will undoubtedly lead to an increase of educational requirements in science and narrow the portal through which pharmacists must pass before entering on the work of their life. Especially in organic chemistry will a thorough training be necessary.

One of the leading features of the therapeutics of the present day is the introduction of organic compounds of definite composition as medicines. These compounds are the outcome of conjoint chemical and pharmacological investigations. By putting an atom of amidogen into this compound, or an atom of ethyl into that, it is possible, as Schmiedeberg and others have shown, to build up substances whose physiological and therapeutic action can be foreseen. Already we have dimethyloxychinizin (antipyrin), tetrahydroparachinanisol (thallin), oxychinolinemethylhydride (kairin), dimethylæthylcarbinol (hydrate of amylene), and many others. Doubtless, too, we shall have many more. At present probably the majority are supplied fairly pure, but as the use of these compounds extends they, like the alkaloids and galenical preparations, will require the supervision of the pharmacist—a supervision which he cannot exercise unless well versed in chemical science.

Let me say, in drawing this paper to a conclusion, that I have purposely looked at the future of pharmacy from a medical point of view only. I know full well that grave difficulties stand in the way of the pharmacists as a body accepting the *rôle* which I have set forth as desirable for them. It may be, indeed, that the obstacles are insuperable. I hope this is not the case, however, for of this I am quite convinced, the rise of pharmacy to a higher estate or its fall to a lower depends on whether what I may call its more scientific functions are accepted or declined.

[To illustrate the influence of extremely small amounts of active principles on tissues, Professor Leech caused contraction of the gastronemius of a frog by the induced current before and after the application of a solution containing 1 in 30,000 of veratrine. The curve taken by means of a lever writing on a revolving drum showed the immense change in the form of contraction which so small a quantity of this alkaloid produces in a most striking manner. Other curves, showing the antagonising effects of drugs and the influence of varying amounts of the same drug were also shown.]

The PRESIDENT, in proposing a vote of thanks to Professor Leech for his extremely admirable and suggestive paper, said the members of the Conference were much indebted to him for coming forward, notwithstanding the pressure of his professional duties, to give them this paper. He thought he could promise him that the members would ponder it very carefully and deliberately when they saw it in print. He did not know when he had been so deeply impressed with the importance of pharmacists endeavouring to provide for the medical profession drugs and chemicals—and especially alkaloidal principles—of purity and definiteness. He had been deeply impressed by witnessing the experiments that morning, for if those infinitesimal doses of active principles produced such results as had been shown beyond contradiction—it was no theory, but absolute demonstration—it surely behoved them in the performance of their special duties, namely, the obtaining and preparing of medicines for the use of the medical profession, to do their very best to secure purity and definiteness. He felt that no paper could have been more germane to the work of the Conference than one of this type, since it was their *raison d'être* to represent the higher cultured side of pharmacy, and to that point Professor Leech had called marked attention. Their future must largely depend on their capacity to fulfil the special function which devolved upon them in the administration of medicine and cure of disease.

Mr. BALKWILL asked if he were right in assuming that the extremely small quantities of medicine which had been used in the experiments, which carried the mind at first to the idea of infinitesimal doses, would represent the amount of that medicine which would be circulated in the blood, and so reach the muscles through the capillaries.

Mr. MOSS thought the President had so well expressed the general feeling with regard to this paper that there was very little need be said by others. What occurred to him on seeing the experiment performed was that provided he and other pharmacists did succeed in getting preparations of an absolutely uniform character, and they were always doing their best so to do with some measure of success, it would be necessary for medical men to weigh their patients.

Mr. GERRARD, as a practical pharmacist, was able from a considerable amount of work to corroborate a great deal of what Professor Leech had said, not from his experience as a physiological experimenter, but from witnessing the experiments of others. He had been largely engaged in making solutions for physiological experiments, and from time to time they had been returned to him, although the substances were weighed in the same balance, taken from the same bottle, and every possible care taken to select material from the same sources, and yet the same preparation made in that way would give different results, and the most fractional quantity in excess of an acid or alkali had been found to make considerable differences in the result of the experiment. It was found that check experiments had to be made to neutralize such results as were produced by the slight excess of acids which occasionally had to be employed to get alkaloids into anything like a presentable solution, and even the exposure of distilled water to the air for a few hours would make a difference in the tracing resulting from a physiological experiment. No doubt their aim should be as far as possible to obtain

preparations of a standardized character, from which measured results could be obtained, but, as had been mentioned, the effect of these on the strength of the muscle must be taken into consideration; they had to deal with weak muscles and strong muscles, and he should like to ask if there were any means of determining with accuracy the relative strength of muscles.

Mr. LASCELLES-SCOTT said the eloquent discourse to which they had listened that morning was unusually appropriate to the meeting, and peculiarly appropriate to the particular phase through which medical pharmacy was now passing. They stood on the threshold almost of a new departure from the old system of medicine, which dealt with drugs by the pound and draughts by the gallon, and were now seeking to take the essence as it were, the spirit of these preparations, and to give them in a simple and pure form in the place of a complex and indefinite form. He was much pleased to find that Professor Leech had impressed upon them the necessity of looking out for very small differences in the quality of alkaloids, and, he would venture to add, also of glucosides, because he conceived that the action upon muscles in the simple and beautiful way just demonstrated would enable them to get over some of the difficulties which had been forced upon English scientists by the operation of the Vivisection Act. Abroad there was no difficulty at all. If they came across a new substance which seemed to produce a marked effect on the animal economy, there was no hesitation in trying it upon an animal, alive or dead. He was not going to argue for or against that freedom, but hoped all members of the Conference would take to heart Professor Leech's observations, because he had shown how by acting on a dead muscle it was possible to obtain many of the effects which their *confrères* abroad obtained by acting on the living suffering body. But that was not all. He was pleased to note that the general tone of the discourse seemed to indicate, as its text, that there should be a little more real fraternity between medical men and pharmacists, and he ventured to think the paper might be regarded in some sense as an indication that they might join hands together for the advantage of science on the one hand and the benefit of suffering humanity on the other. It came to him as a very appropriate sequel to a lecture by Professor Fenwick, he had heard the other day, when he struck out an entirely new departure in his address at St. Peter's Hospital; leaving the usual cut-and-dried hospital lecture on one side he showed his students how much they were indebted to pharmacists in providing them with new, purer, and far better preparations. He thought that not only the Conference, but pharmacists all over the country, would feel that Professor Leech's paper would have great and good results.

Mr. WILLIAMS said he had listened to the paper with great interest, and it seemed to indicate the direction which he believed modern pharmacy was striving to follow. Their efforts were to bring everything to as certain and absolute a condition, not only of purity, but standard strength, as could possibly be, so that medical men might know what they were really using, and not be obliged to rely even upon the reputation of great houses. He might illustrate that by reminding the members that photography, an art which had gone side by side with chemical research and medical practice, had shown how important this question was, and photographers had really been in advance of medical men in discriminating the purity of the chemicals they used. No doubt it had been within the observation of many present that photographers had been able to condemn an impure chemical long before medical men had been able to do so. This encouraged him to think that they might progress in improving processes, and in getting more like standard conditions, and he trusted the time would come when medicine would be as certain, and the operation of drugs and chemicals upon the human system as well understood, as they were in the more mechanical art of photography or in the allied branches of knowledge.

Professor LEECH, in reply, said the experiment shown was perhaps striking as the result was so visible. The influence of doses of one-thirtieth of a grain of arsenic on the human body was quite as marked an example of the effect of minute doses. He had heard the word "infinitesimal" applied to the amount of veratrine used. This term is usually applied when millionths and billionths are alluded to; from these infinitely small amounts no visible results follow. It was easy to understand, however, that one part of a powerful alkaloid in many thousands of the fluids of the body might act very definitely. One part in 100,000 of veratrine in the blood, for example, could produce a very distinct effect, for a grain given to a man would perhaps kill him, yet if this be distributed throughout the blood of the body the proportion of alkaloid to blood will be smaller than 1 to 100,000. It was quite true, as one of the speakers suggested, that body weight had an important influence on the action of drugs, and pharmacologists are accustomed to weigh the dogs and even the frogs subjected to experiment. A time might come when the weight of the patient would have to be taken into consideration by the therapeutist; at present he was more concerned in weighing his patients' peculiarities. In both men and animals drugs act differently in health and disease; the pharmacologist had to study their effects under both conditions. Frogs react differently to agents according to the condition they are in, and therapeutists as well as pharmacologists had to take into account the influence of disease on the tissues of their patients, yet the purity of drugs was the matter of chief importance. What he had wished to do was to strengthen the hands of those in the Pharmaceutical Society and Conference who were endeavouring to improve the character of drugs. He knew, as Mr. Williams had said, that much had been done already, and his paper would have fulfilled its purpose if it in any way strengthened the hands of those who were pressing forward in the direction of a definite standard of purity. It had been said very truly that photographers had been before medical men in demanding and obtaining pure reagents. His feeling was that the demand would lead to supply, and his observation showed that there was an increasing demand for the supply of pure drugs which must be met. He had mentioned on the previous day that Owens College had established a large materia medica museum and a pharmaceutical laboratory, where they taught pharmacy to both medical students and pharmacists, and it would give great pleasure to himself and the Curator, Mr. Elborne, if any gentlemen would like to inspect them.

A paper was then read entitled—

THE ESTIMATION OF SMALL QUANTITIES OF SALICYLIC ACID IN WINES, ETC.

BY WALTER H. INCE, A.I.C.

Literature.—Chem. Centr., 1886, p. 412; *Journ. de Pharm. et de Chim.*, July, 1881; *Arch. Pharm.*, [3], xxi., p. 296; *Bied. Centr.*, 1883, p. 495; *Compt. Rend.*, 1881, p. 406; 'Year-Book of Pharm.,' 1881, p. 650; *Chem. Zeit.*, 1882, p. 619.

The difficulty in the detection and estimation of salicylic acid is to extract it in a sufficiently pure form to apply the reagents.

Most of the tests lose their delicacy in the presence of the slightest trace of either acid or alkali; the extraction, therefore, of salicylic acid in a perfectly free and practically neutral state is the first desideratum.

H. Pellet and J. de Groberts (*Compt. Rend.*, 1881) extract the suspected body with ether, and apply the reagents to the ethereal residue.

Siebold and Bradbury ('Year-Book of Pharmacy,' 1881) precipitate colouring matter with a lead salt.

Both these methods, though useful qualitatively, were found to be practically useless quantitatively; in the first case, the ether extracts varying quantities of salicylic acid, and in the second place, the nitrate of lead left in solution interferes more or less with the colorimetric reactions, otherwise reliable; elimination by sulphuric acid or hydrogen sulphide is objectionable for the same reason.

After many trials I found that distillation in a current of steam was a satisfactory method of extracting a definite quantity of the acid from a definite volume of wine or similar body.

The next consideration was a reliable reagent which would give a definite colour, suitable for colorimetric assay, or some substance which would give reliable volumetric results.

The tests tried were as follows:—

I. *Ferric Chloride*, either applied as a dilute neutral solution (sp. gr. 1·001) or by my method of ferrous chloride and bromine vapour. This forms a good test for general purposes, but, for reasons which I cannot explain, the colour varies slightly from violet-brown to rich violet. Moreover, ferric chloride, however dilute, possesses a certain colour, which is apt to mask the violet coloration when salicylic acid is present in the proportion of 1 to 600,000 or more of water. Ferric chloride is besides very unstable, and rapidly decomposes into free hydrochloric acid and colloidal ferric hydrate.

Its delicacy is 1 in 800,000 to 1,000,000.

II. *Millon's Test* (acid nitrate of mercury $N_4O_7(HO)_2(HgO)_2$) consists of the addition of a solution of mercuric nitrate in dilute nitric acid to a hot solution of salicylic acid.

Red colour: delicacy the same as ferric chloride.

III. *Hypochlorite of Sodium* added to ammoniacal solution with gentle heat. Blue colour; only useful in strong solutions, 1 in 700.

IV. *Bromine Water*, with formation of a white crystalline precipitate: a good rough quantitative reaction in dilute solutions: the turbidity gives an indication of quantity, 1 in 20,000.

V. *Ferrocyanide of Potassium* added to boiling solution, followed by potassium hydrate, ferrous sulphate, ferric chloride and excess of hydrochloric acid, produces a blue coloration due to hydrocyanic acid.

Very delicate, but useless in quantitative work.

VI. *Cupric Sulphate*: green colour, 1 in 600.

VII. *Potassium Permanganate* to acid solution; with decolorization on warming. This I hoped to make a very delicate reaction, either by simply determining the point where the decolorization ceased, or by adding excess of a standard permanganate solution, boiling, and then adding potassic iodide and determining the quantity of liberated iodine by thiosulphate of sodium, and so indirectly the quantity of permanganate used.

Unfortunately, however, extracted bodies other than salicylic acid are also obtained, which act in the same way and so render the test useless.

Finally I decided on adopting the first two, namely, the ferric chloride and mercuric nitrate, as indicators, in conjunction with distillation.

The process works well within certain limits, giving reliable proximate results; the working is as follows:—

210 c.c. of the liquid to be analysed with 10 c.c. of diluted sulphuric acid are placed in a retort fitted with a suitable condenser and distilled.

The first 50 c.c. are rejected, and the next two 50 c.c. separately collected; the liquid in the retort is kept boiling rapidly the whole time.

The sulphuric acid is added in order to free the salicylic acid from combination, as in claret containing a large quantity of tannin little or no salicylic acid distils over. The first 50 c.c. are rejected as they consist mainly of dilute alcohol, and until the whole of the alcohol has passed over no salicylic acid is obtained.

The last two 50 c.c. may be dealt with in either of the following ways:—

I. They are placed in two flasks on a water-bath and 10 c.c. of a 10 per cent. solution of mercuric nitrate in dilute nitric acid are added to each. If there is much salicylic acid present a red coloration will immediately appear; should only very little be present there is no coloration for five or even ten minutes.

The flasks are kept on the bath for twenty-five minutes, when they are taken off and cooled.

Three or four flasks are then taken, and in them 50 c.c. of distilled water, a few drops of ethylic alcohol, and varying measured quantities of standard salicylic acid solution are placed, and treated with mercuric nitrate in the same way.

After twenty-five minutes have elapsed the contents of the trial flasks are cooled and compared colorimetrically in Nessler glasses with the first two; the result in c.c. multiplied by 7·69 (Log. ·88593) gives the number of grains per pint of salicylic acid.

II. The alternative method of estimating is to collect the second and third 50 c.c. in Nessler glasses, and add a definite quantity of ferric chloride solution to each; the colours must be compared with varying quantities of standard salicylic acid.

In both processes care must be taken to place *exactly* the same quantity of indicator in each, so that the liquids under examination be subjected to exactly the same conditions.

The second 50 c.c. is kept apart so as not to unnecessarily dilute the third 50 c.c., which generally contains the greater proportion of salicylic acid.

Standard Salicylic Acid Solution.—The standard solution consists of 2·4 grams of pure salicylic acid in 1 litre of distilled water: of this 1 c.c. in 210 c.c. = ·1 grain per pint. It is always advisable to make a check qualitative experiment with ferric chloride when using the mercuric nitrate for an indicator, so as to prevent the possibility of a red or yellow tinge being due to some oxidized matter mechanically carried over by the steam.

If distilled rapidly, the quantity of salicylic acid that comes over in the second and third 50 c.c. is, for all practical purposes, the same. When the percentage of alcohol is high the salicylic acid is correspondingly low; but as salicylic acid is only introduced in wines of low alcoholic strength, this does not affect the value of the process.

The following figures are examples of some of the experiments with pure wines:—

210 c.c. taken.	No. of c.c. of standard acid added to the wine.	Equal to grains per pint.	No. of c.c. the 2nd and 3rd 50 c.c. required.	No of c.c. × 7·69.
Claret A . .	5	·5	·64	4·9216
,, B . .	10	1·0	1·3	9·997
,, C . .	10	1·0	1·4	10·766
Vin Blanc A .	5	·5	·66	5·0754
B .	10	1·0	1·3	9·997
C .	15	1·5	2·0	15·38
Sherry A . .	5	·5	·63	4·8447
,, A . .	10	1·0	1·2	9·228
,, B . .	5	·5	·64	4·9216
,, B . .	10	1·0	1·1	8 459
,, C . .	10	1·0	1·3	9·997
,, C . .	15	1·5	1·9	14·611
Port A . . .	10	1·0	1·2	9·228
,, B . . .	10	1·0	1·1	8·459
Spiritus tenuior	10	1·0	·2	1·538
S. V. R. . .	10	1·0	·0	·0

With very little practice the number of c.c. required of the standard acid may be readily predicted.

The growers in the south of France add salicylic acid to poor wines in the proportion of ·4 to ·7 of a grain to a

pint: ·8 to 1 grain per pint is sufficient to preserve beer from turning sour.

I have to tender my best thanks to Dr. Attfield, M. Arnoud (S. France), M. Emery (S. France) and M. Ebertin (Lyons) for samples of wine for experimental purposes.

The above experiments were conducted in Dr. Attfield's private laboratory at 17, Bloomsbury Square, London, W.C.

The PRESIDENT, in proposing a vote of thanks to Mr. Ince, said they would all join in wishing him success in the continuation of his scientific studies on the continent, and would hope to be furnished at some future meeting with some of the results which would no doubt follow his scientific investigations.

Mr. REYNOLDS said it was usually understood that the French Government, in extending its paternal care over its citizens, forbade the use of salicylic acid; it might be that some small proportion was permitted, and perhaps Mr. Ince would be able to say what that amount was in the case of wines.

Mr. LASCELLES-SCOTT asked whether Mr. Ince, in distillation, used the wine as supplied *per se*, or whether he added some alkali or alkaline earth first in order to fix the salicylic acid. He had had some little experience in the examination of wines and beers suspected to contain this acid, and his best results were obtained by adding to the liquor some hydrate of barium in the first instance, to allow him to get rid of the alcohol, then disengaging the salicylic acid by sulphuric acid, and applying a current of steam.

Mr. GERRARD asked if Mr. Ince observed any decomposition of salicylic acid during the distillation, because it was generally understood that at a high temperature it underwent partial decomposition.

Mr. INCE, in reply, said he believed it was determined by the Health Committee, which met in Belgium at the beginning of this year, that salicylic acid was detrimental to health, and therefore none at all was allowed, but many adulterations took place, and in the case of weak wines, the peasants themselves added it to their own wine to preserve it. No alkali was added to the wine originally, because if absolute alcohol were placed with salicylic acid, the whole of the alcohol distilled over, and not a trace of salicylic acid was found in the distillate until the alcohol was removed. A slight decomposition might go on during the distillation, but if even half the salicylic acid were destroyed, and half came over, being originally checked by pure wine, the results would be the same as if none were destroyed.

The next paper was a—

NOTE ON THE TESTING AND PURIFICATION OF HYDROCHLORATE OF COCAINE.

BY JOHN WILLIAMS, F.C.S., F I.C.

So much has been written and such various statements made respecting cocaine and its salts, that I am almost afraid to offer any remarks upon such a subject; but I think many present will agree with me that samples of the hydrochlorate especially are found to frequently vary in quality, so much so, that it is a very desirable thing, if possible, to have a ready mode of testing and if necessary purifying the article, therefore I venture to b ing before the attention of the Conference the following note, which I trust will be found of use for the desired end.

The process I recommend for the purpose is very simple, and depends upon the almost absolute insolubility of the hydrochlorate of cocaine in ether (although cocaine itself is so freely soluble) and the fact that most if not all the secondary salts (or impurities) appear to be soluble even when converted into hydrochlorate.

The plan I adopt is to dissolve the cocaine hydrochlorate to be examined in the smallest quantity of absolute alcohol of sp. gr. ·795; to this solution it is simply necessary to add about six times the volume of pure ether, and allow the mixture after shaking several times to stand for ten minutes or more, when the crystalline precipitate of the pure salt can be thrown on a small filter, squeezed, spread on blotting paper, and allowed to dry. In the course of a few hours the smell of ether will have quite gone, and the weight of the salt can be ascertained. Of course if the weight of the original sample had been taken, its quality can be at once ascertained.

In performing this operation, the only essential point to remember is that both the alcohol and the ether must be quite free from water; in other words, absolute.

If it is desired to ascertain the purity of the alkaloid cocaine itself, this is done by dissolving the sample in absolute alcohol, and adding very cautiously, and drop by drop, strong hydrochloric acid, testing after each drop with previously damped (but not wet) litmus or turmeric paper, when neutrality or very slight acidity is produced, the ether can be added and the process carried on as with the solid salt.

Cocaine in a crude state is now sent into this country from abroad, I believe especially from South America. Some of this crude cocaine is very impure, and it is very necessary to test it carefully; the process I have given effects this object very easily.

If the cocaine operated upon is very impure, the addition of the ether to the alcoholic solution of the hydrochlorate will produce a milky liquid, which, even after some time, will be found very difficult to filter, as the very fine precipitate runs through the filter and the liquid cannot be got to filter bright. I have found, however, that by adding a somewhat larger proportion of ether, and allowing the mixture to stand with occasional shaking for some time, the milky precipitate at last becomes crystalline, and can then be filtered readily. A very pure sample of hydrochlorate hardly becomes milky at all, but deposits the crystalline salt in a very few minutes.

If it is desired to examine the ecognine or amorphous cocaine, or any of the other products or bodies described by various authors, of course the ether and alcohol must be evaporated off, and in the residue left these products will be found. I have given but a small amount of attention to them, but have come to the conclusion (perhaps hastily) that they are not of the value (medicinally speaking) which cocaine certainly possesses, and that they will hardly repay any very elaborate investigation; or perhaps it would be fairer to say that with our present knowledge we are not in a position to pronounce an opinion.

The cocaine hydrochlorate purified in the way I have described I think it will be generally admitted is very much improved. The complaints frequently made about its "mousey" smell, and also reports from medical men of considerable pain sometimes produced by the use of the drug, will I think no longer occur if this process of purification is adopted. In fact, this process of purification is simply bringing cocaine back to the state of purity which it possessed when first made and offered to the medical practitioner, and when its fame was established. I fear it must be admitted that since that time many samples have got into the market, which have not been of the highest standard of purity, and that some of the doubts which have been from time to time thrown upon the medicinal value of cocaine are really due to this cause.

The PRESIDENT, in moving a vote of thanks to Mr. Williams, said a more valuable moral or application to the paper they had that morning heard from Professor Leech could hardly have been given. A great deal more had yet to be said on the question of cocaine, and they were much indebted to Mr. Williams for this contribution, brief as it was, but to the extent to which it went absolutely reliable.

Mr. SHEPPARD asked the best method of preserving cocaine in solution for application. He had had occasion to dispense a great deal within the last few years, and found that when kept in a water ten per cent. solution it became muddy after a few days. He had lately dispensed it in a camphor-mixture, and found it keep better than with pure water, but even then after keeping it for a week or so it became turbid.

Mr. CHRISTY said the great merit of this paper was that if pharmaceutical students would only gather from it how to treat the enormous quantity of cocaine regularly coming from Peru and Bolivia it would save merchants having to send it all to Germany; it did not stop in this country, whereas if Mr. Williams's method could be followed, English pharmacists would be able to treat it here.

Dr. SYMES said his experience of cocaine was that when first introduced the results obtained with it were highly satisfactory, but the article usually met with then was of a somewhat more basic character than it was now. Whenever a medicinal substance was obtained and found to be of value naturally, they endeavoured to refine it, and so get it more elegant, and occasionally possibly they over-stepped the mark in some direction; for instance, as a commercial article cocaine hydrochlorate could now be obtained in a more crystalline condition, much nicer in appearance than it could originally, and he believed that was due to the fact that the salt was neutral, or slightly acid, but to the extent to which it was acid it was less effective, weight for weight. For some time it was thought useless to apply cocaine hydrochlorate to any other than a mucous surface, or as a hypodermic injection, and as applied to the skin it was thought of little or no value, but it had been ascertained that if the skin, instead of being acid as it naturally was, were washed with carbonate of soda the cocaine hydrochlorate was effective. That supported the view that its efficiency was as a basic salt rather than otherwise. He would ask Mr. Williams whether, taking basic hydrochlorate, and treating it as he suggested, the cocaine, which was itself soluble in ether, would not be lost, and whether even its medicinal activity would not be impaired to the extent to which he took out any cocaine traceable in the sample. His impression was that a very fairly pure article was obtainable in the market. He was not referring to what was acknowledged to be crude cocaine, but he thought the hydrochlorate obtained in the ordinary way was fairly pure. Where it failed frequently was in the application of it; the dentist complained of it more frequently than the medical man, because he had more difficulty in bringing it into contact with the nerve; unless deeply injected it had little effect on the nerve which he wished to deal with. The pharmacist should not immediately condemn his hydrochlorate as impure, because he heard complaints about it simply that it had been used for some purpose, and was not effectual. On one occasion he had received a serious complaint about cocaine hydrochlorate which had been sent to South America, and, in fact, the dentist refused to use it further until assured it was pure, when the very same article was being sent out to medical men in England, and produced satisfactory results.

Professor TICHBORNE said he had listened with considerable pleasure to this paper, as he had some knowledge of the subject, and quite agreed with Mr. Williams that the qualities in the market were very varied. It was his fate to have occasionally to neutralize the cocaine alkaloid as found in commerce with salicylic acid, and having a note of what was originally the saturating power of a sample of pure cocaine made by Merck he found that he very rarely got the same figures, and further than that two samples from the same manufacturer rarely coincided. He would ask Mr. Williams if he had come to any conclusion what was the origin of that peculiar mousey smell which everybody who had had to do with cocaine would have noticed. It was evident that there was a substance present having an odour which was remarkably like that of conine. As regarded keeping in solution he would recommend a method of his own. Some years ago he put before the Conference the application of a salicylate for keeping solutions of the alkaloids, chiefly in connection with atropine. Some serious effects had been produced by the use of muddy solutions of cocaine hydrochlorate, the muddiness being due to some fungoid growth which appeared in warm weather in two or three days. He found that camphor water would not keep cocaine except for a short time, and when the fungoid growth was once produced it was not a matter simply of loss of strength, but of danger, as such a solution sometimes produced a very peculiar ophthalmic disease. If a faintly acid solution of salicylate of cocaine were carefully prepared, it would keep at least twelve months, if not longer.

Mr. MABEN corroborated what Dr. Symes had said. Some samples were much more amorphous than others. He had asked medical practitioners to take special notice whether any difference was found in the operation of these different samples, but they had not found any appreciable difference.

Mr. WILLIAMS, in reply, said he did not think he could add much in answer to Mr. Sheppard, as it was not in his department of pharmacy; the same with regard to Professor Tichborne's remarks. He should not like to speak about the keeping properties of hydrochlorate of cocaine when in solution, as he had not investigated it. It was quite true that a considerable quantity of cocaine at present did go to Germany and came back again to England in a more or less finished state. His efforts were rather to show that they could do without that process, and that the English manufacturer or even pharmacist could perform this operation so readily that he could purify his own cocaine. Dr. Symes had remarked that probably some of the cocaine was lost, and also remarked on the acidity; he found that if a hydrochlorate containing free acid were used the acidity was retained in solution in the alcohol and ether. He could only say that with a pure sample of hydrochlorate of cocaine—he had tried the experiment over and over again—if 100 grains were taken, dissolved in absolute alcohol and precipitated by absolute ether there was not a loss of one grain. There was a loss when a commercial or comparatively impure hydrochlorate of cocaine was precipitated, but it only lost what ought to be lost—impurity. He also thought that if some of the cocaine were tested in the way he had described with litmus paper it would be found perfectly neutral, and could be used for hypodermic and other purposes without the slightest hesitation. He also agreed with Dr. Symes that the ordinary commercial hydrochlorate in the market was a very good article; he was not saying a word against it; but still he thought, as Professor Tichborne had mentioned, as it was known to vary, there was no reason why it should not be brought to perfection. The real increase in cost was very trifling, for there was no reason why methylated ether should not be used. The whole of the odour of methyl went off, and he did not think it made the slightest difference to the result. The saturating power he had not gone into; he had been satisfied with getting an apparently definite result.

The next paper was—

PHARMACEUTICAL NOTES ON SOME SYNTHETICAL COMPOUNDS RECENTLY INTRODUCED INTO MEDICINE.

BY H. HELBING,

Apotheker of the German Hospital, London.

The remarkable increase in the number of organic compounds contained in the materia medica, which recently has been even much more rapid than formerly, may be taken as a reliable indication of the progress made by the chemistry of medicine in later years.

When we remember that before the commencement of this century the separation of active principles like morphine or quinine from the raw drug was unknown, we cannot restrain from admiration of the vast number of synthetically prepared remedies which have since been introduced, and of which the greater part is of quite recent origin.

In attempting to place before you an account of a number of these modern improvements, I have paid special regard to the pharmaceutical side of the question and have avoided lengthy formulæ, or the minute details of preparation, as also chemical reactions. I have confined myself to giving in alphabetical order a description of certain antipyretics, anseptics and soporifics, samples of which you here see, together with suitable combinations and preparations of them. Details are also given of the nature, solubility and therapeutic value of these remedies, besides a few hints which may be found to be of use in dispensing. I also note the melting and boiling point of each, as these are of great importance in determining the purity of the preparation; indeed they supply the chemist with ready means of testing the article for himself at once.

Acetphenetidin, Paracetphenetidin,

$$NH(COCH_3)C_6H_4.OC_2H_5.$$

This antipyretic has only been in use for a short time, but the results hitherto obtained with it are described as excellent. Hinsberg and Kast have shown that a dose of 3 to 8 grains is able to reduce the temperature of the human body by 3·6° F., and the experiments carried out in the clinic of Professor von Bamberger, of Vienna, have only tended to confirm the favourable accounts of the discoverers. It appears to be perfectly devoid of secondary effects, and fully able to bear comparison with all other febrifuges.

It is a greyish-white crystalline powder without smell, producing a slightly pungent after-taste; it is practically insoluble in water, but dissolves readily in alcohol. The melting point is at 275° F. It is advantageously prescribed in the form of powders containing the above-mentioned dose, since from its tastelessness it is readily taken by patients.

Amylene hydrate.—Tertiary amylic alcohol, dimethyl ethylcarbinol,

$$\begin{matrix} CH_3 \\ CH_3 \\ C_2H_5 \end{matrix} \!\!> C.OH.$$

Only a few weeks ago this compound was recommended by Professor Jolly and von Mering as a soporific, in which class of remedies it appears to have taken a prominent place. Before applying it to patients numerous experiments on animals had been carefully carried out. A dose of ℥j. is sufficient to produce sleep for six or eight hours. No unpleasant secondary effects are recorded.

The remedy is given in water (in which it is soluble in the proportion of 1 : 12) with a little juice of liquorice.

Amylene hydrate.	
Liq. glycyrrhizæ	āā ℥j.
Aq.	ad ℥j.

S. to be shaken before use.

It is also administered in capsules of gelatine.

It is a clear fluid with an odour reminding one slightly of camphor; it is soluble also in alcohol. Specific gravity 0·812 at 53·6° F. Boiling point 216° F.

Antifebrin, acetanilide, phenylacetamide,

$$C_6H_5NH.CH_3CO.$$

Since the first experiments with this valuable remedy, performed by Drs. Cahn and Hepp in Strasburg, antifebrin has been carefully studied by others, and with the same satisfactory results. It possesses the advantages over other remedies of this class of being low in price, and moreover the dose is small; 2 to 10 grains once, twice, or at most three times a day sufficing to produce a considerable reduction of temperature in cases of typhoid fever, pneumonia, also in erysipelas and acute rheumatic gout. It is given in powders as well as in solution; for the latter mode of administration it will be found most advisable to dissolve it in brandy, subsequently adding a little water and syrup. The following formula is given as an example :—

Antifebrin	℥j.
Brandy	℥ivss.
Dissolve and add—	
Distilled water,	
Simple syrup	āā ℥vj.

One tablespoonful to be taken as directed.

The remedy is thus rendered very pleasant to take, and the patients express no aversion to it.

A good preparation should be of pure white colour, and form moderately large crystals, which are but very sparingly soluble in cold water, rather more readily in hot, and easily in alcohol; antifebrin melts at 233·6°, and boils at 563°.

Antipyrin, oxydimethylchinizine, $C_{10}H_9CH_3.N_2O$.—Antipyrin may fairly be considered the most popular of modern antipyretics. The dose varies from 15 to 30 grains twice, three or more times a day. For children 3 to 12 grains will be found to be sufficient. It is of great value in all febrile diseases, reducing temperature very promptly. Of late it has also been applied in subcutaneous injection as a local anæsthetic. In some cases a bright pink rash, like nettle rash, will suddenly appear during treatment; this is considered to be of no importance, as it causes no inconvenience and soon disappears.

Antipyrin is readily soluble in water and alcohol; it possesses but little flavour, and that not unpleasant; and is, therefore, adapted for administration in solution. It thus possesses great advantages over quinine, especially in treating children, who take it very readily if mixed with a little syrup, thus :—

Antipyrin	80 gr.
Simple syrup	℥j.
Water add to	℥iv.

Two teaspoonfuls for a dose.

This mixture is almost free from bitterness, and children do not at all object to it.

It crystallizes in colourless laminæ, which melt at a temperature between 230° and 235·4° F.

Antithermin, phenylhydrazinlevulinic acid,

$$CH_3C(C_6H_5N-NH)CH_2-CH_2COOH.$$

has been recommended as a febrifuge, but although it is now obtainable in the market, details are still wanting as to dose and effect. It forms large colourless crystals of a slightly bitter taste, which cause an unpleasant grating when ground between the teeth. It is insoluble in water, and but sparingly soluble in alcohol. The most suitable form for administering antithermin is the pilular.

Aseptol, acidum sozolicum, orthophenolsulphonic acid, $C_6H_4OHSO_2OH$.—By aseptol we understand a 33⅓ per cent. solution of orthophenolsulphonic acid. It is almost odourless, but faintly suggests carbolic acid, and is reported to possess the antiseptic properties of this latter antiseptic and of salicylic acid, standing, as regards strength, midway between them. Its superiority lies in the possession of antiseptic without poisonous or irritating properties, so that it is especially adapted for abdominal surgery and for ophthalmological operations. Sozolic acid is readily soluble in water, alcohol and glycerine. It is applied in a solution of 3, 5 or 10 per cent., to which strength the stronger solution can be reduced by dilution with water.

Betol, salicylate of β naphthol ether,

$$C_6H_4OH.COO.C_{10}H_7.$$

This remedy is one of the very newest, and analogous to salol. It is applicable therefore in all those cases in which this latter is found to be of use, viz., rheumatism. cystitis, etc. The dose is given as 5 to 8 grains in some cases of intestinal catarrh. As it is not a phenol compound, betol possesses the advantage of being freer from detrimental properties than salol.

It forms small, white, resplendent crystals, is almost devoid of taste, and being insoluble in water is best dispensed as a powder or in compressed tablets, or in pills made up with liquorice juice and powder, each containing 2½ grains of betol. It is soluble in alcohol, as also in fatty oils, and is therefore well adapted for being worked up with butter of cacao into pencils for the treatment of gonorrhœa. These may be prepared by melting four parts of ol. theobromæ, and adding to the warm liquid one part of betol. This readily dissolves in the fat and the mixture is allowed to partially cool, when it is poured into moulds. The finished product contains of course 20 per cent of betol.

The melting point of betol is 203°.

Hypnon, acetophenon, $C_6H_5COCH_3$.

By means of 3 to 8 grain doses of this very powerful soporific a profounder sleep is produced than that caused by chloral hydrate. Hypnon possesses an agreeable aroma somewhat resembling a mixture of oil of bitter almonds and neroli, but its action on the mucous membrane of the mouth is almost caustic. It is dispensed therefore in capsules of gelatine, each of which contains 1 grain of the remedy combined with 10 of almond oil to prevent any risk of unpleasant effects.

It is a colourless fluid, sparingly soluble in water, more readily so in alcohol, of the specific gravity 1·032 at 59° F., the boiling point being 410° F.

Methylal, dimethylether of methylene, $CH_2(O.CH_3)_2$.—Methylal is a soporific of very recent date. It is administered in doses of 20 to 25 grains in water, with a little syrup.

Thus:—

Methylal	℥j.
Syr. orange flower	℥ss.
Water	℥j.

One tablespoonful for a dose.

It has also been applied externally as a local anæsthetic dissolved in oil, or as an ointment, with lard as a base. Both forms are made to contain 15 per cent. of methylal.

It is a colourless ethereal fluid which smells like a mixture of chloroform and acetic ether, and tastes pungent and aromatic; it is readily soluble in water as well as in alcohol; the specific gravity at 59° F. is 0·855; it boils at 107·6°

Naphtalin, $C_{10}H_8$.—To most fungi naphtalin has been found to be a powerful poison, and has proved very valuable as an antiseptic, being applied in the same manner as iodoform. Professor Rossbach of Jena first administered it internally in cases of acute and chronic enteric catarrh, in typhoid fever and acute gastro-intestinal catarrh. It has since been extensively applied, but not with absolutely uniform results. It is given as a powder in wafer in doses of 2 to 8 grains, to which a drop of oil of bergamot is added to obliterate the peculiar smell of tar belonging to it, which makes it otherwise impossible for some patients to take it. For example the following formula may be adopted:—

Naphtalin	30 gr.
Sacch. alb.	30 gr.
Ol. bergam.	1 gr.

Make a powder and divide into ten doses, one to be taken three times a day.

Naphtalin is a crystalline body forming colourless, resplendent scales; it tastes pungent, is insoluble in water, but sparingly soluble in cold alcohol and fatty oil, but readily if these agents are heated. The solution in oil and the ointments should be made to contain 10 per cent. of naphtalin, which must be added to the warm fatty matter. Melting point 176° F., boiling point 424·4°.

Naphtol β=naphthol, isonaphtol, $C_{10}H_7OH$.—As a substitute for tar preparations, naphtol has been applied to the skin with very good results, especially in psoriasis and other chronic affections. A 2 to 5 per cent solution in alcohol is the usual form of application, but it can also be made up into ointment containing 3 to 25 per cent. Internal administration of this compound was attended with toxic effects, and has, therefore, been discontinued.

It crystallizes in resplendent scales, has an aromatic odour, is slightly soluble in hot water, readily so in alcohol and fatty oil. A very good ointment made be made by adding 1 part of naphtol to 10 of melted lard and well stirring. The substance dissolves without much difficulty and forms a white smooth product.

Naphtol melts at 253°, and boils at 546·8°.

It should not be confounded with naphtalin.

Salol, phenylether of salicylic acid,

$$C_6H_4OH.COO.C_6H_5.$$

This remedy appears to give the greatest promise of future importance, for in the short time that it has been known, it has done very good service as a febrifuge and an anti-rheumatic, being administered in doses of 15 to 30 grains two or three times a day, as also as a gargle ℥ij. thus—

Salol	℥ij.
Spirit. vin.	℥iv.

A teaspoonful to a glass of warm water for stomatitis and ulcerations of the mouth and pharynx.

A salol mouthwash is also very much recommended, and may be prepared as follows:—

Take salol gr. 40, dissolve in ℥iv. of a suitable spirituous dentifrice liquid. Half a teaspoonful to be used in a glass of water, with which it forms a milky emulsion.

For chronic forms of diphtheria, it is reported to have more powerful effect than solutions of chlorate of potassium or salicylic acid. It is also applied, worked up with butter of cacao into pencils, as an antiseptic. These are prepared in a similar manner to those of betol before mentioned.

Salol is a white crystalline powder of a mild aromatic odour; it is insoluble in water, but soluble in alcohol. The melting point is 108° F.

Thallin $C_9H_{10}N(OCH_3)$.—Thallin is employed either as sulphate or tartrate. It is rapidly obtaining a recognized position in the materia medica, for it is a reliable and powerful antipyretic, applicable in all kinds of febrile conditions. Three to 8 grains in pill are considered a suitable dose. It is also applied externally, especially lately, with great success for injections in cases of acute and chronic gonorrhœa, for which it is prescribed in aqueous solutions containing 1 drachm of the thallin salt in ℥vj.

Salts of thallin are crystalline powders, not quite pure white in colour, of a bitter and intensely aromatic taste, and of a peculiarly persistent odour, which is similar to that of cumarin; they are readily soluble in water, but far less so in alcohol.

Urethan.—Ethyl of urethan, $CO(NH_2).OC_2H_5$. As a mild hypnotic urethan is very useful, being administered in doses of 15 to 40 grains, either as a powder or in solution, with a little syrup as a corrective. Thus—

Urethan	℥ij.
Syr. simpl.	℥j.
Aqua	℥iij.

Two tablespoonfuls for a dose.

It does not produce a comatose condition like chloral-hydrate, but tends to induce a healthy natural sleep in cases where this is impeded by other causes.

It is a crystalline body of a mild ethereal odour, tastes somewhat like saltpetre, is soluble in water and alcohol, and melts at about 120° F.

The list comprises a considerable number of remedies which German chemists are obliged to have always in readiness, as they are continually, and indeed almost daily, required in making up prescriptions. The greater part of these compounds are now hardly considered new in Germany, having obtained a recognized position in the materia medica, and having, as such, become in a great number of cases favourite drugs of many physicians. But as far as my experience goes, such is by no means the case in England.

This subject is a very important one, and it would be interesting to know why English physicians and English chemists do not pay these remedies that attention which they have been considered by other scientists to merit and repay. That this neglect really exists in this country is almost indisputable; at any rate these articles are sold but in very small quantities compared, for instance, with the consumption of them in Germany. Salol, as I have been informed by competent authorities, has scarcely been used at all here. The statistics of the manufacturing firm, show, that of antipyrin, one of the most extensively applied antipyretics, five hundred times as much is used on the continent as in England. Nevertheless antipyrin has been so thoroughly studied by numberless authors, that doubts certainly cannot be entertained as to its being a most valuable remedy.

No one can fail to be struck with the active endeavours made by men of the profession in England to obtain standard preparations, and their preference for remedies containing a definite quantity of active principles. Consequently it might be presumed that these synthetical compounds, which really represent the *beau ideal* of concentrated, pure and uniform preparations, would quickly command that attention which has already been accorded to them elsewhere. I conclude my remarks with an expression of the hope that these medicines will soon find a place in British pharmacy, which in other respects calls for cordial admiration on account of its high scientific standing, and the care expended in a thorough investigation of all valuable remedies.

I shall be pleased to offer some of the best preparations mentioned in the above list to the Museum of the Pharmaceutical Society.

The PRESIDENT, in proposing a vote of thanks to Mr. Helbing, drew special attention to the very fine specimen of betol shown. If he remembered rightly Dr. Paul had recently called attention to this article in the Journal. The paper was specially interesting as giving point to the address they had heard from Professor Leech that morning. With regard to the moral of his story as to the different course pursued by medical men in Germany and in England, of course that was a question on which they could offer no opinion, but at any rate it was a matter of great interest to see such fine specimens of some of these new remedies.

Mr. COLLIER said he could not agree with the remark that few of these things were used in this country. Several of them had been employed in the hospital to which he was attached, but they did not seem to possess all those properties which were attributed to them. He got a certain quantity of one of them and it was at first used rather largely, and he had to obtain an increased quantity. Then the whole thing seemed to drop out, and he had at the present time some of them in his cupboard which would never come out until they were cleared away. One of the latest tried was kairin, which had proved rather dangerous, and the effects were not found to be satisfactory.

Dr. SYMES did not think the reproach that these things were not used in this country should go forth unchallenged, for on this point he could support the remarks of the last speaker. He did not wish to at all discount the importance of their being brought forward, but they were very largely used in this country, although all the effects they were said to possess in the first instance were not endorsed. It was due to English physicians to say that quite recently they had shown that antipyrin possessed other properties than those which were originally attributed to it. It was now being used as an anæsthetic. He thought that medical men in this country were quite willing to use and pharmacists were quite ready to supply these new remedies as soon as they had any authoritative information of their usefulness.

The next paper was a—

NOTE ON CAMPHOR OIL.

BY PETER MACEWAN, F.C.S.

Some years ago the volatile oil, which is obtained in Japan as a bye-product during the manufacture of camphor, was introduced into this country as a therapeutic agent, and I had the opportunity of examining a specimen which had been presented to the Pharmaceutical Society, and found that it did not contain camphor. Afterwards Mr. John Moss communicated a paper to this Conference, in which he gave analytical results of a number of samples of the oil, showing that it is of a very variable nature. A wish expressed at that time for a complete analysis of the oil was very shortly satisfied in the paper communicated to the Chemical Society by Mr. Yoshida, a Japanese chemist (*Journ. Chem. Soc.*, October, 1885, p. 779), who showed that the oil consists of two hydrocarbons boiling at 150° C. and 172° to 173° C., camphor (about 23 per cent.) and an oxygenated oil, *camphorogenol*, which through the influence of heat and oxidation changes into camphor, thus accounting for the deposition of camphor in the oil through age. The oil is still used to a considerable extent in this country, and large quantities are imported into the United States, where, it is stated, its principal use is as an adulterant of essential oils, especially peppermint oil.

I have examined numerous samples of the oil during the past two years, and have been struck with the great range of quality which they exhibit. Some are almost colourless, others very dark, and their other physical characters show great variation, as may be judged from the figures which are given below. In the discussion on Mr. Moss's paper there was some doubt as to the cause of the dark coloration of some samples, but that point was cleared up by Mr. Yoshida. The colour is not due to the tins in which the oil is imported, but to the heat which it is subjected to ; in other words, the dark oils are residues, as may be judged by the following results :—

Sample A. A dark brown oil with a perceptible green shade, specific gravity 0·960. A measured volume fractionated gave no distillate below 180° C. The fractions were :—

	Per cent.	Specific gravity
180–190° C.	21·5	0·915
190–202° C.	*nil*	
202–210° C.	22·0	0·945
210–225° C.	28·0	0·977

The residue had a specific gravity of 0·998, and was quite free from camphor, so were all the fractions. As camphor begins to distil about 200° C. it is evident that the oil contained none. Sample B was of a curious character. It was similar to A in appearance, but was heavier (specific gravity 0·995). It was heated for some hours far above the boiling point of camphor, but not a drop of distillate was obtained. I have examined other samples of a similar character with the same results, the inference being that high specific gravity and dark colour are indicative of absence of camphor.

The following results were obtained with samples which were of a pale colour:—C was a water-white oil, D and E of a pale straw colour, and F was amber coloured. Their specific gravities were:—C, 0·926; D, 0·933; E, 0·922; F, 0·974.

They gave on distillation the following results:—

C.	Per cent.	D.	Per cent.
140–150° C. .	4		
150–170° C. .	32		
170–190° C. .	30	175–192° C. .	38·5
190–202° C. .	6	192–202° C. .	31·5
E.	**Per cent.**	**F.**	**Per cent.**
150–178° C. .	18·5		
178–190° C. .	40·5	180–195° C. .	7·5
190–202° C. .	10·0	195–205° C. .	20·0

In each case camphor began to distil at the highest temperature noted, and the residues on cooling contained crystals of camphor, and were of a brown colour. None of the fractions yielded crystals of camphor on cooling to

0° C. The specific gravity of the distillates between 150° and 178° varied from 0·886 to 0·892, and between 170° and 195° from 0·901 to 0·921, this variation being due to the distillate being more abundant at the beginning or end of the fraction. I did not find it possible to estimate the amount of camphor in each oil, obviously that is not possible by heating, as the camphorogenol would be changed in the process; but I may say that sample D gave the most abundant distillate of camphor. Sample F should be compared with A and B, both as regards its fractions and specific gravity. It is evidently a mixture of such an oil as D and a residue oil, probably with some camphor added to it; some insight is added to the latter suggestion by the fact that a higher temperature than in other cases was required to distil off the camphor. C is an excellent oil, better in appearance than any other, and evidently more carefully prepared.

It is desirable that camphor oil should be brought to some state of uniformity before it gets into the hands of the retailer, and to do this the dark and heavy oils should be excluded, as suggested by Mr. Moss, the rest bulked and submitted to distillation so as to get rid of all that will distil below 170° or 175° C. The distillate would be very suitable for varnish making.

I observe that a paper on "Camphor Oil" was recently contributed to the Massachusetts Pharmaceutical Association by Mr. E. C. Marshall, who comes to the conclusion that the oil supplied by wholesale druggists in the United States contains no camphor, having arrived at this opinion by simply cooling the oils to the freezing point of water. This is not a conclusive test; the oil must be distilled in order to get a true idea of its worth, and the results should be judged in connection with the specific gravity. If it contain the lighter hydrocarbons it is evident that it has not been subjected to prolonged heating in order to get all the camphor out of it, and these light hydrocarbons are the better solvents of camphor, so that they prevent its separation on freezing, unless it is present in large quantity.

Samples A, B, D and E were taken from the tins in which they were imported. I am indebted to Mr. John Moss for them. C and F are oils as supplied to retailers.

Mr. JOHN MOSS said they were all much obliged to Mr. MacEwan for this paper, but he did not quite follow his reasoning when he said he thought one sample of oil had had camphor added to it; he could hardly imagine that such was the case, seeing that camphor was four times as valuable as the oil. It might be interesting to the meeting to know that immense quantities of this oil were imported into Europe for distillation, and found their way into various industries. The endeavour made some short time ago to use camphor oil generally in pharmacy had only been partially successful, it only being used to a very limited extent. A great deal of the oil which came from Japan, and thousands of cases came every year, went to German oil refiners and distillers, and were by them subjected to cold to extract the camphor, of which large quantities were obtained in this way. It was then distilled, the lighter oils being used chiefly for making varnishes, drying paints, and things of that kind, and an enormous quantity came to this country for these purposes. The next heavier oil was almost identical with the natural oil of sassafras, and to it the name of safrol was given. Some of it, he believed, found its way into pharmacy under the name of oil of sassafras, going round by way of America. It was not much used in pharmacy, however, its chief use being for soap-making. He had been informed recently by a large distiller that he had succeeded in isolating from the heavier oils, after safrol had been separated, a considerable portion of eugenol, the heavier portion of the oil of cloves, and so large a quantity did he deal with that although the proportion of eugenol was very minute the total quantity produced was very large. This gentleman did not believe very much in Yoshida's camphorogenol, which he thought was simply the lighter oil which gradually underwent a process of chemical change, and produced camphor. Of course the name was a perfectly true descriptive name to apply to the light oil, provided his friend was correct as to the fact, but Yoshida applied it to a distinct body which he said he isolated.

Mr. MACEWAN explained that his reasons for thinking that camphor had been added were given fully in the paper. He could not account for the abnormal figures produced in any other way.

A paper was then read entitled—

SOME FUNDAMENTAL ERRORS IN THE BRITISH PHARMACOPŒIA.

BY CHARLES R. C. TICHBORNE, LL.D., L.A.H.I., F.I.C., ETC.

At the time that the British Pharmacopœia of 1885 appeared, there were multifarious criticisms upon that book. Perhaps no work ever published in our generation got such a critical analysis. Some were carping, a large proportion of the criticisms erroneous, and I must confess a very small minority correct. Even to the present day, however, some stand uncorrected, such as that on p. 27, where the manufacturer of sulphurous acid is directed to put 30 oz. of distilled water into a 20 oz. bottle. I am inclined to think that as a whole, very few books (containing so much condensed work) are so free from errors. In making my remarks on Pharmacopœial errors, of course I am not going to discuss or consider what might be suggestions for possibly improved formulæ; I am dealing with actual mistakes. There are errors and calculations in connection with the weights, however, which permeate the whole of the Pharmacopœia and which I think should be carefully put to rights in the new edition. Thus in the temperature used in graduating measures used by the Pharmacopœia and those graduated by law, there is a discrepancy which throws everything into confusion. The errors produced are not large, but unfortunately they pervade every calculation in the book, and produce that uneasy feeling which must prevail where we are knowingly working upon wrong data. How can we accept such paragraphs as the following, which we quote from the B.P., under such a state of things? Preface (1885) says, "among the objects contemplated in revising the process for various preparations has been that of promoting increased uniformity of strength." Again in Preface (1887), "By the Medical Act, it is enacted that the General Council should cause to be published," etc, "together with the true weights and measures by which they are to be prepared." Again, "it is to afford to the members of the medical profession and those engaged in the preparation of medicines throughout the British possessions one uniform standard and guide, whereby the nature and composition of substances to be used in medicines may be ascertained with the object of establishing uniformity of strength and composition." We are informed in the same preface that the legalized imperial weights and measures are to be used, but that specific gravities are to be taken at 60° F. In the appendix we are informed that the volumetric solutions are to be made with vessels graduated at 60° F., and all measurements are to be made at 60° F. One of the worst examples of confusion is, however, the statement that we are to make the measurements with true metric apparatus at 60° F. Thus it will be seen that the Pharmacopœia works and makes all measurements at 60°, whilst the imperial measures used are graduated at 62° F., and the metric measures should be graduated at 39·2° F. I should mention that I brought this matter before the General Medical Council, but, unfortunately, too late for anything to be done. The whole of the B.P. was then in type. Nothing, however, could be more courteous than the action of Drs. Quain, Collins, and other members of the Pharmacopœia Committee, who might very legitimately have

looked upon me as a bit of a nuisance. I had previously set the Standards Department in motion, who also communicated with the Pharmacopœia Committee, urging them to adopt a standard of temperature which should coincide with the standard of temperature adopted in the construction of weights and measures.

In a communication received by the Medical Council upon the subject the matter of the gallon is concisely put as follows:—"It is desirable to maintain the legal standard of temperature of 62° F. This temperature was proposed in 1820 by the Standard Commission, and has been adopted in all successive Acts relating to weights and measures. It is at this temperature only that the standard gallon, the yard and the pound have their true values. The temperature of 60° has been followed in error by many of our high modern chemical authorities, and it would appear to have been originally used for hydrometric purposes, and hence has improperly found its way into modern practice." Now, it is self-evident that a common standard of temperature should be agreed upon by the common consent of the Legislature of the country and scientific men. On looking into the matter I see at once that so many important Acts of Parliament are connected with the question that it would not be expedient, in my opinion, to change the temperature standard (62°). Nor can I see any reason for retaining the standard of 60° F., except it be for the convenience of holders of stock of volumetric apparatus. They would, I am sure, be recouped by the large demand for new instruments. Some year ago, in communicating with the Standards Department of the Board of the Trade, in connection with the standard cubic foot of gas, my attention was called to the fact that all the standards of weights and measures as defined and used in numerous Acts of Parliament were based upon these data, or measurements taken at a temperature of 62° F. and all referable to a fixed natural standard, viz., a pendulum vibrating under certain arbitrary conditions. The standard gallon when divided into 70,000 parts constitutes the unit, or the standard grain. As a worker in science I am aware that it is a very general practice to make all measurements, etc., at a temperature of 60° F., and I had under consideration for some time past how far this discrepance would affect many of the methods adopted in practical sciences, and naturally examined the Pharmacopœia from this point of view. I find the weights and measures throughout the body of that work are divisions of the above specified gallon containing 70,000 standard grains, whilst the volumetric solutions are constructed upon the gallon at 60° F., which contains about 70,011 grains as determined by myself theroretically.* Mr. Chaney, of the Standards Department, kindly gives the results of actual experimental determination. I will quote his words. "If we weigh a gallon of distilled water in a brass vessel when the temperature of the water, brass, and air is each at 62° F., we find, as pointed out in your letter of yesterday, that the gallon of water weighs 70,000 grains. If, however, we weigh the same gallon when the temperature of the water, brass, and air is each at 60° F., we find the gallon of water weighs 8·5 grains more, or 70,008·5 grains. If we weigh a gallon of pure water in a glass vessel under the different conditions above stated, then at 62° the gallon of water weighs 70,000, but at 60° it weighs 70,010·45,"—very near my theoretical 11 grains. "The above results are for pressure of thirty inches, but as we know variation of barometric pressure makes but little difference, about 2·5 grains on the gallon for every inch of the barometer above or below thirty inches. The vessel in which the water is contained becomes of the same temperature as the water itself, and hence it is inpracticable to assume as some do that the water is held in an imaginary vessel whose temperature changeth not." Let us see how these variations affect the calculations of the B.P. In estimating dilute sulphuric acid (p. 26) we are directed to take 6 drachms (the division of the 70,000 grained gallon) and estimate it by a volumetric solution made according to my calculations theoretically per 70,011 grains per gallon. We are therefore working under such conditions that we could only obtain correct results by taking and measuring the substance to be estimated at 62° F., and by using and maintaining the temperature of the volumetric solution at 60° F.—a condition of things not indicated in the directions of the Pharmacopœia (*vide* p. 489), nor is it the principle upon which a reliable volumetric analysis is made. We are supposed to be working not so much at a fixed temperature as at an equal temperature, and also assuming that all instruments used in one experiment have been graduated at the same temperature. The temperature of the room where you are working is a matter of secondary importance, because it will affect the temperature of all the fluids you are estimating equally. But in making a standard solution the temperature becomes important, and your solution must lie either at 60° or 62°, according to the construction of your measures.

Again, at page 487, such statements as "the grain measure" at 60°, "being the volume of a grain of distilled water," is superfluously untrue; and again, a very equivocal position arises from multiplying the standard grains throughout the work by specific gravities taken at 60° F.

I have already said that the most striking point of all is that we have in the Pharmacopœia still further complicated matters by the adoption and use of the true metric standard, but with an intimation at the same time that we must measure and work with it at 60° F. The litre and cubic centimetre vessels are supposed by the Committee to be true measures agreeing with the metric system, and that there should be no mistake upon the point a special note is added to show that the c.c. is one fluid gram of water at 4° C. (39·2° F.). The results follow that in making the volumetric solution of oxalic acid, if we use grams and cubic centimetres in making this solution at 60° we shall dissolve 63 grams of oxalic acid not in 1000 grams of water, or a litre, but in about 999 grams of water only. It follows that the whole of the calculations in connection with the metric system are also erroneous. I refer to such statements as that 100 cubic centimetres of solution of oxalic acid are equal to 5·23 grams weight of carbonate of ammonia, or 19·1 of borax. We are told that 100 cubic centimetres of volumetric solution of nitrate of silver equal 27 grams of hydrocyanic acid. So it would, if we had not been unfortunately directed to use metric measure, and then directed to work at 60° F. In such a case your 100 c.c. of volumetric silver made one-tenth of an equivalent per 1000 parts will in English instruments give the hydrocyanic ·12 per cent. higher than it really is.

The volumetric instruments in this country seem to be generally graduated at a temperature of 60° F., as evidenced by the following experimental determinations:—

Experiment 1.—25 c.c. flask at 60° F. contained by weight 24·986 grams = 999·44 per litre.

Experiment 2.—25 c.c. pipette at 60° F. contained by weight 24·987 grams = 999·48 per litre.

Experiment 3.—20 c.c. flask (foreign) at 60° F. contained by weight 19·867 grams = 993·35 per litre.

Experiment 4.—10 c.c. pipette at 60° F. contained by weight 9·983 grams = 998·30 per litre.

Throwing out experiment 3 and taking the highest and lowest, these experiments give us an error of 1·11 per thousand parts (993·89 grams per litre). Mr. Sutton, in noticing this error, puts it down as $\frac{1}{1000}$. This error of 1·11 would amount to 77·7 grains when calculated upon an imperial gallon.

If we take the graduation upon the same instrument at 62° F., the following will be the result:—

Experiment 5.—25 c.c. flask at 62° F. contained by weight 24·982 grams H_2O = 999·28 per litre.

* Calculated from the tables of expansion of water by heat.

Experiment 6.—25 c.c. pipette at 62° F. contained by weight 24·985 grams $H_2O = 999·40$ per litre.

Experiment 7.—20 c.c. flask (foreign) at 62° F. contained by weight 19·84 grams $H_2O = 992·02$ per litre.

Experiment 8.—10 c.c. pipette at 62° F. contained by weight 9·98 grams $H_2O = 998·0$ per litre.

At this temperature the experiments would give an average of 998·70 or an error of 1·30 per thousand, which would equal 91 grains on the gallon.

From the above we see that in making the volumetric solution of silver we should dissolve 17 parts (one-tenth of an equivalent) not in 1000 parts of water, but in less than 999 parts of water, and so on as regards all the volumetric solutions. A volumetic solution made in a true litre measure must not be used from a vessel graduated at 60°, and should not be used in connection with gram weights. Then to return to the estimation of hydrocyanic acid. The Pharmacopœia says that "100 c.c. of the volumetric solution of nitrate of silver will equal 27 grams of hydrocyanic acid (2 per cent.)." This statement would be correct if it were not for the graduation at 60°, but here, although we imagine we have used 100 c.c., we have really only used 99·889 of nitrate of silver solution, and therefore—

$$\frac{99·889 \times 27}{100} = 26·97$$

a difference of one-half a grain upon this small experiment, or an error of 0·12 per cent. in the estimation of such an important substance as hydrocyanic acid. We are, of course, assuming that we are using a volumetric solution either made in true French measures or with English measures.

I am aware that it will be said that the error of 11 grains per gallon, or even 77 grains per gallon will never poison any one. That may possibly be true, but such errors are not absolutely necessary and could be easily avoided, and therefore they should not disfigure a standard work which is to serve for general calculations and as a legal authority under the Adulteration Acts. By this arrangement we have arrived at the invention of a new so-called metric scale based upon no system.

If we are going to graduate our vessels at 60°, why call them cubic centimetres and litres—which they are not?

The PRESIDENT, in expressing the thanks of the Conference, said Professor Tichborne had conferred a great favour on the Conference in bringing forward this paper. Exactness in weights, measures and temparatures, as far as practicable, were to be desired.

Mr. ABRAHAM was much pleased that this question had been brought forward by a gentlemen of Professor Tichborne's position. He had ventured on more than one occasion to point out the anomaly between the measures and the metric weights. He trusted now that Professor Tichborne had pointed out this inaccuracy more forcibly some remedy might be devised.

Mr. LASCELLES-SCOTT remarked that when the Pharmacopœia first appeared there was what some one called a perfect howl of complaint from all quarters; in some instances perhaps the criticisms were not called for, but in too many cases they were found to be based on truth. Various corrections had been officially made, and the editors had to admit a number of errors. The result of that criticism and of such papers as they had heard that morning would be, he hoped, to induce the Medical Council to make good use of pharmacists' knowledge for the next edition, and he felt sure that having the assistance of Professor Attfield he would keep them right in the future, or nearly so. One point upon which Professor Attfield had anticipated criticism was with regard to these errors in weights and measures, but it must be remembered that if there were an error to begin with in a volumetric solution, of only 11 grains to the gallon, it might very well be counterbalanced by the ordinary inevitable errors of analysis; but supposing the latter were in the same direction as those Professor Tichborne spoke of, the aggregate might be very large, and the analyst would be held responsible for errors which were really due to defective measures.

Professor TICHBORNE, in reply, said he had two objects in bringing forward this paper, one was that the subject should be thoroughly ventilated and investigated before the next edition of the Pharmacopœia came out, and he was quite sure that now attention had been attracted to it it would not remain as it was. No doubt the matter would be well looked after by Professor Attfield. Secondly, every one liked to get credit for his own observations, and he had thought it desirable to put it on record that he had brought this matter before the Pharmacopœia Committee, who no doubt would consider it. The Conference had heard that morning, in connection with Professor Leech's admirable paper, what small doses would act upon the human body, and it had been suggested that it was desirable to weigh the patient in order to regulate the doses. He, however, could not see that there would be any use in weighing patients if they could not estimate hydrocyanic and similar medicines to ·13 per cent.

A paper was then read on—

A SPURIOUS CUBEB.

BY WILLIAM KIRKBY, F.R.M.S.,
Pharmaceutical Chemist.

The large extent to which cubebs have been adulterated during the last few years is so well known to every pharmacist that it will hardly be a matter of surprise that I should bring another instance of cubeb substitution under your notice.

In 1885 (*Pharm. Journ.*, [3], xv., 653) I described a false cubeb which a little prior to that time had been spoken of as being probably the fruit of *Piper crassipes*. My paper appears to have had the unexpected result of confirming the opinion that such was the source of this drug, although I distinctly pointed out how it differed from the description given in 'Pharmacographia' of a reputed specimen of *P. crassipes*: namely, in *P. crassipes* having a pedicel from one and a half times to twice as long as the berry, and having a very bitter taste, while the berry described has a pedicel usually about the same length as the fruit, and a taste which cannot be described as very bitter. Instead of referring to this variety therefore as *Piper crassipes* I shall call it the "short-stalked" variety, leaving the identity of it to be determined by an examination of authentic fruits, which I hope to be able to undertake when the necessary material comes to hand.

At the beginning of this year I received from Mr. E. M. Holmes a supply of false berries more nearly resembling cubebs in certain respects than any previous substitute.

Like cubebs they consist of a berry supported on a non-articulated stalk. The globose head is generally flattened on the top, with sometimes a slight elevation at the apex; the base is suddenly contracted into the pedicel, which not infrequently arises from a depression, and is stouter than in the true drug as well as being laterally compressed. In colour they vary but little, being of a dark brown tint; they are more or less wrinkled according to the stage of their development. When freshly bruised an abundance of essential oil exudes, having an agreeable camphoraceous odour remind-

Fig. 1.

ing one strongly of cajuput; the taste is aromatic, somewhat pungent and bitter. The diameter of the head ranges from 4 to 7 mm., and the length of the stalk from

7 to 11 mm., being from one and a half times to twice as long as the berry (fig. 1). In the more fully developed fruits, known by their comparatively smooth skin, the perisperm is seen to be white and starchy.

The pericarp consists of the same number of layers as in cubebs (fig. 2). In my previous paper the example of

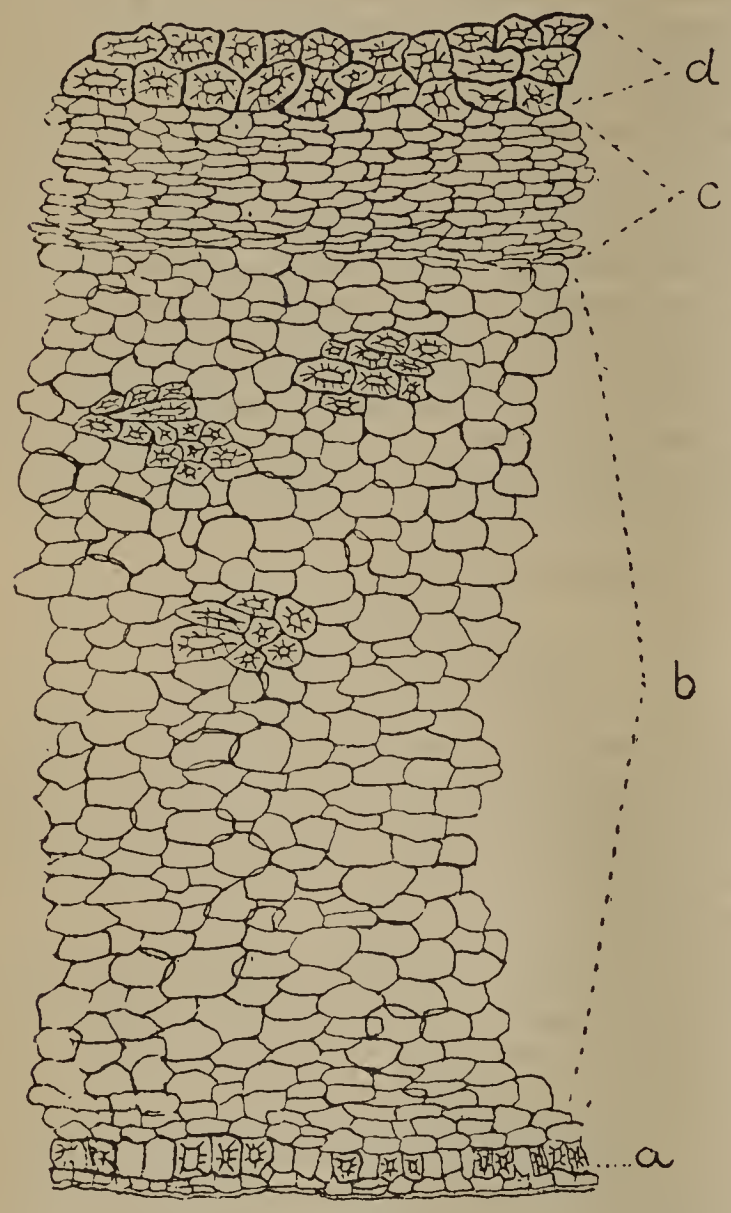

Fig. 2.—Section of pericarp of spurious cubebs ×62. *a*, epidermal layers; *b*, epicarp; *c*, mesocarp; *d*, endocarp.

other writers* was followed in applying the term testa to the inner shell of the pericarp. This I now think to be incorrect, for though there are four distinct layers in the pericarp the testa and the tegmen are found attached to the seed, which is only united to the hard inner shell of the pericarp at its base. It will therefore be seen that the terms used in this paper have not reference to the same parts as in the former one.

The epidermis is composed of small flattened cells covering an interrupted ring of cubical sclerotic cells. Within this is the broad layer of loose parenchyma interspersed with larger cells containing oil. These latter resist the action of strong sulphuric acid to a greater extent than the surrounding tissue, and the oil is not coloured by being left in contact with it. Small groups of stone elements are present in it; also a quantity of starch. The succeeding portion comprises about eight or ten rows of regularly arranged thin walled cells, extended tangentially; it is free from starch, but the inner rows contain small crystals of calcium oxalate. I find that crystals are likewise present in the "short-stalked" drug and in cubebs; but are much smaller, indeed in cubebs they are almost indistinguishable, hence my failure to discern them before. In both these instances calcium carbonate was found, while but little is present in this specimen. From this it may be inferred that there is some connection between the two salts. The inner part of the pericarp, found as a hard shell, and described before as the testa, consists of two, or occasionally three courses of angular, isodiametrical, sclerotic cells. Between the epicarp and mesocarp are from sixteen to eighteen woody bundles; the xylem is composed of a few spiral vessels, and the phloem of soft bast with one or two fibres. The seed is in structure identical with that of cubebs, the integuments consisting of two membranes, and the perisperm of hexagonal cells, radially elongated, containing an abundance of starch. The starch granules are small, angular, and have a very distinct central hilum. The greater portion of the cells contain a globular starch body, consisting of an agglomeration of starch granules; these are a very characteristic feature (fig. 3)

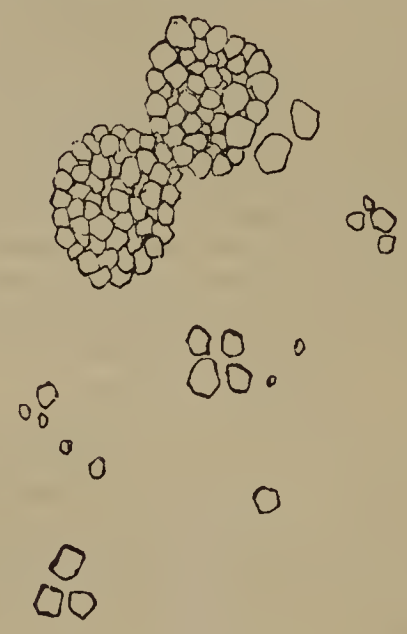

Fig. 3.—Starch of spurious cubebs ×620.

Strong sulphuric acid reveals no specialized cells by any colour reaction.

In structure this drug differs from cubebs in having stone elements in the epicarp, in having more than four rows of cells in the mesocarp, in the endocarp having isodiametrical stone cells in more than one row and not radially extended, in the larger crystals of calcium oxalate in the mesocarp, in having the round starch bodies in the perisperm, and in the oil giving no colour reaction with sulphuric acid. It differs from the "short-stalked" drug in the same particulars with the exception that they both have about the same number of cells in the mesocarp.

In the unground state it may be distinguished from cubebs by its larger size, less wrinkled surface, flattened pedicel, its cajuput odour when bruised, and by giving no carmine colour when crushed on a white surface and treated with strong sulphuric acid. From the "short-stalked" variety it may be known by its longer pedicel, darker colour and different odour. In the powder it may be at once recognized by its characteristic starch bodies.

The PRESIDENT, in proposing a vote of thanks to Mr. Kirkby, said this paper strikingly illustrated the value of microscopic work in pharmacy. Mr. Kirkby's reputation as a botanist and microscopist was not confined to the north of England, but was well recognized in Bloomsbury Square. Though the note was but a brief one, no one could have listened to it without being struck by the careful and prolonged examination with the microscope which his specimen had received.

Mr. HOLMES said the members were much indebted to Mr. Kirkby for placing in their hands the means of detecting this possible adulteration of powdered cubebs, and those who had to deal with that drug must know that, having become very scarce, cubebs was not only adulterated, but several other peppers, etc., were offered as substitutes for it. One of these consisted of the fruits doubtfully attributed to *Piper crassipes*, which possessed different medicinal properties, and produced noxious effects when taken; a second substitute was not known to possess injurious properties, and as to the third

* 'Pharmacographia,' 1874, p. 522.

one, which Mr. Kirkby had now brought forward, they know nothing about its medicinal properties, or whether it was superior or inferior to the genuine, or dangerous. Should it prove to be injurious, pharmacists were now in a position to detect its presence. Within the last week he had examined the best sample he could procure of the cubebs at present in commerce, and found it contained not only *Piper crassipes*, but also several of the other adulterants which were met with previously, mixed together with genuine cubebs, and also some of the very immature fruits which had been recently imported. He had lately received a specimen from Professor Flückiger of what he described under the name of *Piper crassipes*, and the fruit differed in several particulars, notably in greater bitterness and shorter stalks than that hitherto known by that name in commerce. Special prominence might be given to the fact that the fruit in the whole state did not give a crimson reaction with sulphuric acid. He had placed on the table a sample of original cubebs, and also of *Piper crassipes* from the Pharmaceutical Society's Museum, so that members could judge by comparison of the odour of the true cubeb and its adulterants.

Dr. SYMES said this paper had considerable interest from a pharmaceutical point of view. They had all felt until recently that if they obtained cubebs which appeared to be genuine, and had them freshly ground, that was the best possible way of supplying a good powdered cubeb. Owing to the scarcity of the drug and its higher price many persons who formerly ground cubebs themselves had taken to buying it in smaller quantities ready ground. Mr. Kirkby had shown how one adulterant might be detected in the powder, but there was a very rough pharmaceutical process for detecting a very common adulterant, that was by triturating it with a little water in a mortar, when a considerable quantity of sand or gritty matter would be found in very many specimens. He had failed to find a specimen lately in which there was not too large a portion of silicious matter. A specimen from quite a respectable house recently contained 12 per cent. of ash, and he had been able to wash out sandy matter by merely triturating the powder, and pouring it off two or three times from a mortar. It was far better that they should look for this foreign matter themselves than leave it to the public analyst to do so.

The next paper on the list was—

A CONTRIBUTION TO THE CHEMISTRY OF THE NITRITES AND OF NITROGLYCERINE.

BY G. ARMSTRONG ATKINSON, M.D.,

Late Demonstrator of Materia Medica in the University of Edinburgh.

In the *Pharmaceutical Journal* for July 3, 1886, I published a paper on the "Pharmacognosy of the Nitrites," in which several interesting questions were discussed.

It is desired in the present paper to offer the results of further work at this important subject. Historically, the discovery of the earliest known nitrite, nitrite of ethyl, is usually accredited to Raymond Lully (1235-1315). He seems, however, merely to have recognized the violent action of strong nitric acid upon alcohol, and to have allowed the bulk of the ether, the ethereal nitrous gas of the older chemists, to escape. To Kunkel belongs the credit of indicating in 1681 the importance of the distillate. The further history of this nitrite and of its impure alcoholic solution, the spirit of nitrous ether of our Pharmacopœia, requires no comment. The other nitrites introduced as of scientific or medicinal interest by various chemists and pharmacologists, as nitrite of amyl by Balard, Guthrie and Richardson; nitrite of potassium by Reichert and Weir Mitchell; nitrite of sodium by Barth and Binz; the double nitrite of potassium and cobalt by Leech, and nitroglycerine—a body closely allied in many of its pharmacological manifestations to a simple nitrite—by Sobrero and Pelikan, have formed a well recognized group. The essential pharmacological basis in this group is nitrous acid. Nitroglycerine is a nitrate of glyceryl, but as Hay showed, this nitrate in the alkaline fluids of the body becomes largely reduced to a nitrite, and so a nitrite action is produced. All the pharmacological action of nitroglycerine is not, however, to be thus explained.

Nitrous acid cannot well be used medicinally owing to its great instability, especially in the presence of water, however dilute the solution may be. For example, it was found that a watery solution of nitrous acid (prepared in any of the ordinary ways) of the strength of 1 in 1000, kept in a stoppered bottle, half filled, in a room at 60° F., in a few hours was only about 1 in 3000, and although it more slowly deteriorated after this, yet in 12–14 days the nitrous element was either absent or but the faintest trace was left. The decomposition is into nitric acid, nitric oxide and water. Two of the dilute acids of the Pharmacopœia, dilute nitric and dilute nitro-hydrochloric acid, contain nitrous acid, but in so minute a quantity as to be of no therapeutical importance. Further, a substance sold as "Acidum Nitrosum," and sometimes used in medicine, is merely a solution of nitrous in nitric acid, the amount of nitrous acid varying greatly. This preparation, when diluted, rapidly acquires the characters of a solution of nitric acid, over which it probably possesses no advantage. The only possible form in which moderately pure nitrous acid could be conveniently exhibited in medicine is as a watery solution of not more than 1 in 3000, the decomposition of which is retarded by admixture with glycerine. The acid, however, has no advantage over its salts, and could obviously only circulate in the blood as a nitrite. Now nitrites are readily decomposed by very dilute hydrochloric acid, the acid of the gastric juice, to the extent of ·2 per cent., and in the stomach a certain amount of decomposition of a nitrite, as nitrite of sodium, will usually occur. The liberated nitrous acid will be partially destroyed, but, as a prolonged series of experiments on the stomachs of rabbits showed, some is absorbed, under normal conditions at least. It is therefore important to know whether after absorption nitrous would replace carbonic acid in the bicarbonate of sodium existing in the blood serum. Dittmar ('Chem. Analysis,' 225) states, "Nitrogen trioxide does not seem to be capable of decomposing the carbonates of the alkalies." To investigate the point, in the first place a stream of carbonic acid gas was passed for hours through solutions of varying strength of nitrite of sodium at temperatures ranging from 60° to 212° F. No decomposition of the nitrite occurred. By mixing solutions of nitrous acid of varying strength with solutions of carbonate and bicarbonate of potassium and of sodium it was found that at all temperatures between 60° and 212° F. nitrous replaced carbonic acid. In these experiments one must be certain no nitrite is contained in the solution of the carbonate employed, a not infrequent impurity, as I pointed out in the *Pharmaceutical Journal* of April 17, 1886. Furthermore, as it is probable a certain amount of phosphate of sodium exists in the blood serum, some physiologists indeed regarding it as largely present, it is of interest to know that although phosphoric replaces nitrous acid, yet judging from experiments allied to those with bicarbonate and carbonate of sodium, nitrous acid converts part of the phosphate of sodium in a solution of that salt into acid phosphate of sodium and forms at the same time some nitrite of sodium.

A brief statement may be made as to some of the other nitrites. Nitrites of sodium and potassium are readily soluble in water; their watery solutions are perfectly stable, provided no fungi be allowed to grow. The solutions can be boiled for hours without undergoing any decomposition, and on exposure to the air they undergo no conversion into nitrate unless nitrifying germs be present. The sodium is more suitable for therapeutical use than the potassium salt, and is readily obtained in a comparatively pure state. It can be further purified by recrys-

tallization from alcoholic or even watery solution. The purified salt can be heated for days over the water-bath without any loss of nitrite. The same naturally holds with nitrite of potassium. It is clear, therefore, that nitrites of sodium and potassium in their solid form, or in solution in the absence of acids chemically stronger than nitrous and of ferments, are perfectly stable.

The nitrite of potassium and cobalt is not of sufficient therapeutical interest to require consideration.

Nitrite of ethyl is chiefly to be considered in regard to its presence in the spirit of nitrous ether. The only point I shall take up in connection with this spirit is as to whether nitric acid, free or combined, exists in it. In a large number of specimens, ascertained to be free from nitro-substitution bodies, the free and combined nitrous acid was estimated by Allen's or Eykman's process, and then the amount of nitric oxide yielded by Schloesing's method of nitric and nitrous acid determination. The nitrous acid present was converted into its equivalent in nitric oxide, deducted from the total nitric oxide and the remainder read as nitric acid. The general result of these experiments showed nitric acid free or combined to be constantly present in the spirit, varying in recent specimens from a mere trace to as much as 1·5 per cent., calculated as hydric nitrate, in old specimens. Moreover, very old specimens of spirit of nitrous ether, from which all nitrite had disappeared, gave nitrate reactions.

The loss of nitrite in spirit of nitrous ether is retarded by the addition of glycerine. This loss is very rapid in watery solutions of the spirit, and is in such solutions also retarded by the addition of glycerine or of spirit, or spirit and glycerine. It is also retarded by the addition of acetate or citrate of ammonium, double decomposition occurring with the formation of some nitrite of ammonium.

Nitrite of amyl usually, when recently prepared, contains 75–80 per cent. of actual nitrite of amyl. This nitrite is stated as being insoluble in water. Recently prepared nitrite of amyl was washed with distilled water until the washings were neutral. The purified nitrite was then for a few seconds shaken up with distilled water, filtered and the neutral filtrate at once examined quantitatively for nitrite. It contained nitrous acid equal to about 1 of nitrite of amyl in 100,000. If the nitrite in excess were left in contact with water for some hours, the filtrate then contained nitrous acid equal to 1 in 1000, but the solution was markedly acid from decomposition of the nitrite of amyl. Following the same process as with spirit of nitrous ether, recently prepared nitrite of amyl was found to contain traces of nitric acid free and combined; old specimens considerable amounts.

The qualitative analysis of nitrites is conveniently carried out either by the starch iodide or by Griess's metaphenylenediamine reaction. With the former 1 of nitrite sodium can be detected at once in 1,000,000 of water, or in 10,000,000 in two or three minutes. The reaction is more delicate if the temperature is comparatively low, and if some time be required owing to the extreme degree of dilution the solution must not be exposed to much light, as light is apparently able to decompose hydriodic acid. With Griess's test 1 of nitrite of sodium is not distinctly indicated in more than 200,000 parts of water. Most of the other numerous tests for nitrites were examined, but they gave less satisfactory results than the above.

The quantitative analysis for inorganic nitrites is best conducted, in simple watery solutions, by a modification of the permanganate process described before the Royal Society of Edinburgh ('Proceedings,' March, 1886, and *Pharm. Journ.*, March 20, 1886). If the solution be not simple, one or other of the colorimetric processes may be employed. For organic nitrites Allen's or Eykman's process is in everyday use, and these processes may also be used for inorganic nitrites, but with less accuracy than the permanganate.

To test for or to estimate approximately nitrites in the blood, it is advisable to use dialysis. In the urine the tests are directly applied, but a certain small loss of nitrite occurs in the urine from destruction of nitrite by the colouring matter, and if the secretion be strongly acid also from liberation of nitrous acid and mutual decomposition occurring between it and the urea.

Finally some points in connection with nitroglycerine may be discussed.—Pure nitroglycerine prepared by myself was a colourless sweet body with a slightly pungent taste, producing its characteristic headache. It volatilized very slightly at ordinary temperatures; 20 grams thoroughly dried, exposed to the air but protected from dust, after ten weeks had lost only 4 milligrammes. When heated over the water-bath the loss is naturally greater. As mentioned in my previous paper (*Pharm. Journ., op. cit.*), it is soluble 1 in 760 of water, but requires some time to dissolve to this extent. It has been mentioned that it decomposes in the presence of alkaline substances with the production of nitrite, and in this connection it is of interest to note that when a saturated watery solution of nitroglycerine is mixed either with a saturated watery solution of bicarbonate or of phosphate of sodium, the principal factors in the production of the alkalinity of the blood, all the solutions being kept at 100° F., the bicarbonate solution contains nitrite in about one hour, the phosphate in twenty to twenty-two minutes. In the system, however, the decomposition has commenced at most in two to three minutes, probably the living tissues rapidly dissociating the ether.

The qualitative and quantitative analysis of nitroglycerine deserves some attention, for the usual qualitative tests applied for its detection both in the arts generally, and in toxicology especially, have been merely the physical characters of the compound and its explosive force on percussion. The quantitative analysis has also been of a very crude nature, the amount found in the stomach for example being merely judged of by the eye, while neither qualitative nor quantitative analysis appears to have been applied to the detection of the ether in the various fluids and tissues of the body. Naturally gravimetric estimation still holds for large or approximately large quantities, but the method by which we can detect the presence of nitroglycerine in extremely minute quantities, as 1 in 500,000, or even 1 in 1,000,000 of water, or accurately estimate the amount in watery or alcoholic solutions, is essentially based on the decomposition it undergoes, as already mentioned, in the presence of various alkaline reagents. In this decomposition two-thirds of its nitric are reduced to nitrous acid, the nitrous acid forming a nitrite of the base employed to decompose the ethereal salt. Hay has formulated an equation for the estimation of the amount of nitroglycerine. He calculates the amount of nitrous acid produced on decomposition of the nitroglycerine in a given volume of liquid, this amount may be termed x. Then since 100 parts of nitroglycerine must yield 33·48 parts of nitrous acid, the amount of nitroglycerine present will be $x \times 100 \div 33{\cdot}48$. The watery or alcoholic solution is most conveniently decomposed by rendering the fluid strongly alkaline by the addition of caustic potash free from nitrite, and boiling for three or four minutes, when the fluid will have acquired a yellow tinge. The depth of colour varies according to the strength of the nitroglycerine solution, and is due to the formation of a reddish-brown aldehydic resin. The amount of nitrous acid present as nitrite is calculated by a colorimetric process, using a standardized solution of nitrite of sodium of the strength of 1 in 500,000 or 1 in 1,000,000 for starch iodide, and 1 in 100,000 for Griess's metaphenylenediamine reaction. The yellow tinge from the resin formation is so faint when the solution is sufficiently diluted as to be of no consequence practically. This direct method of decomposition does not give satisfactory results with the urine, and still less with the blood, unless in the urine large quantities,

comparatively speaking, of the ether be present. In the blood constant decomposition of the nitroglycerine goes on and little is found in it unless the drug be intravenously injected. After large medicinal doses I have usually obtained it in the urine, the urine in these cases frequently also containing traces of nitrites. To estimate the nitroglycerine in the *urine*, if much be present, the urine may be directly alkalinized and boiled, but a loss always occurs, and with less quantities some separation process must be followed. Of these the following gave the most satisfactory results, allowing one of nitroglycerine added to 300,000 parts of my own urine to be detected. 50 c.c. of the urine are treated with ether, the ethereal layer separated, a solution of caustic potash added to it, the ether driven off and the remaining fluid boiled. If any nitrite be extracted by the ether as well, it may be allowed for, or more conveniently destroyed by acidifying and heating the urine before adding the ether.

For the *blood*, dialysis may be employed, but with unsatisfactory results. The best method I have used is similar to that for the urine. The blood is collected in ether and thoroughly exhausted by it. The separated ethereal liquid is decomposed, as in the case of the urine. If any nitrite be extracted from the blood by the ether, which is not usually the case, it may be calculated in a portion before adding the alkali, or may be removed by adding some acidified alcohol and water, and warming; it is preferable as a rule to allow for it however, the opposite course being preferably followed with the urine. Rabbits usually, when bled to death, yield 30 to 50 c.c. of blood: if this amount be collected from the carotid of a rabbit, and a small quantity of a watery solution of nitroglycerine at once shaken up with it, and then the ether process followed out, it is possible to detect 1 of nitroglycerine in 100,000 parts of blood. Animals poisoned with nitroglycerine given per orem have but little of the ether in their blood, partly because it is not rapidly absorbed, partly because it is excreted by the kidneys, but principally on account of its decomposition by the fluids and tissues of the body.

From the gastrointestinal contents in poisoning cases, nitroglycerine can be usually obtained, by extraction with ether, in considerable amount, especially from the stomach. The ether may be in this case merely allowed to evaporate, and the minute globules of nitroglycerine obtained. These globules can also usually be observed in the stomach without further treatment, when much nitroglycerine has been swallowed.

The nitroglycerine in the Tabellæ Nitroglycerini of the Pharmacopœia and in allied preparations is not easily extracted. The largest yield was thus obtained :—The tablet or pill was rubbed with a little water, so as to form a thin paste; this was thoroughly exhausted with ether, and the ethereal solution treated with a solution of caustic potash as previously described. From one tablet the faintest nitrite reaction only was obtained, and I have generally found it necessary in estimating the strength of tablets and pills to fall back on their comparative pharmacological activity, experimenting usually on myself.

The PRESIDENT moved a vote of thanks to Dr. Atkinson for his contribution, which he was sure would repay careful perusal.

Mr. MARTINDALE said he had not tried to estimate the amount of nitroglycerine in preparations made for pharmaceutical purposes, because the quantity required to produce physiological action was so minute that it was almost beyond analysis. One mode of preserving the nitroglycerine for explosive purposes was this: it was very soluble in oils and fats, and from that solution it could easily be obtained again by shaking up in methylated spirit, and then throwing the alcoholic solution into water; the nitroglycerine separated almost in a pure condition. But this process was useless for detecting the minute quantities in ordinary pharmaceutical preparations. One of the earliest workers on the subject was Dr. de Vrij, who read a paper upon it at the meeting of the British Association in 1851, and with regard to its poisonous properties he said that when he first prepared nitroglycerine in 1851 he administered 10 minims to a rabbit without producing the least toxic effect. He thought it might be interesting to the meeting to know that though a very small quantity of nitroglycerine produced physiological action it could hardly be made to kill, and he thought the records of death from it were rather doubtful.

The next paper read was on—

THE CHEMISTRY AND PHARMACOLOGY OF SOME OF THE MORPHINE DERIVATIVES.

BY D. B. DOTT, F.R.S.E., AND RALPH STOCKMAN, M.D.
(From the Materia Medica Department, Edinburgh University.)

Before describing the methods employed for the preparation of the substances used in our experiments, and the precautions taken to ensure their purity, it is desirable to remark briefly on the chemistry of these compounds.

How* appears to have been the first to investigate the action of alkyl iodides on alkaloids, and in his second paper, at least, he clearly recognizes that the resulting products are analogous to methylammonium iodide, and are formed by direct union of the alkyl haloid with the nitrogen of the base. It is curious, in the light of our present knowledge, that How seems to have been surprised that morphine methochloride is merely isomeric with codeine hydrochloride and not identical therewith. In their research† "On the Connection between Chemical Constitution and Physiological Action," Crum Brown and Fraser discuss the chemistry of these bodies, and it is carefully pointed out that they are additive compounds, and the nomenclature adopted is intended to avoid misunderstanding. For instance, the additive compound of strychnine and methyl iodide is called *methylstrychnium iodide*, and we have similarly *methylmorphium iodide* and *ethylcodeium chloride*. It is also shown that by double decomposition with silver sulphate, and treatment of the sulphate with baryta, the hydroxide of the ammonium base is formed. Notwithstanding these facts, a host of writers and compilers, and some experimenters have fallen into the error of describing these additive compounds as methylstrychnine, ethylcodeine, etc., and what is of more importance, they have reasoned from their false premises to fallacious conclusions. To expect, because the addition of methyl chloride to a base produces a certain modification in its physiological action, that the substitution of an atom of methyl for one of hydrogen should cause a similar modification, is evidently unwarranted. It may here be noticed that there is a difficulty regarding the names "methylmorphium chloride" and the like, which is probably sufficient to prevent their systematic use. In methylammonium iodide an atom of hydrogen may be replaced by methyl, and the resulting compound appropriately called "dimethylammonium iodide," because both atoms of methyl are in combination with the same nitrogen atom, and have, in short, the same value. On the other hand, in the case of a complex alkaloid, the methyl may be combined with nitrogen, with oxygen, and probably also with carbon. Whence it is evident that to describe as "diethylmorphium iodide" the compound obtained by addition of ethyl iodide to ethylmorphine would be quite misleading. It seems advisable to adopt the nomenclature now generally used, and say "ethylmorphine ethiodide;" just as we say "morphine hydrochloride," and not "morphium chloride." At the same time it must be borne in mind that these additive compounds differ essentially from ordinary alkaloidal salts. The original alkaloid is not separable from its addition compound, and while the salt of an

* *Chem. Soc. J.*, vi. (1854); 'Trans. R.S.E.,' xxi. (1857).
† 'Trans. R.S.E.,' xxv.

alkaloid has the same physiological action (speaking generally) as the alkaloid itself, the methiodide of an alkaloid has an altogether different action from that of the alkaloid. We can scarcely escape the conviction that the union of hydrogen chloride (HCl) with an alkaloid is not of the same nature as the union of methyl chloride (CH_3Cl) with the base. Indeed, it rather appears that "morphine methochloride" is not a morphine compound at all, but the salt of a new base.

That the compounds of alkaloids and alkyl haloids frequently give the same colour reactions as the alkaloids themselves proves nothing more than that both contain some common nucleus. There is certainly much to be said in favour of the names "methylmorphium chloride," "ethylstrychnium sulphate," etc.

Methylmorphine (*Codeine*), $C_{17}H_{18}(CH_3)NO_3$. — The natural codeine used in the experiments afterwards described was prepared from Turkey opium in the usual way. The artificial codeine was prepared by the action of morphinate of soda on methyl chloride, extraction by chloroform, and subsequent purification. The last mentioned process is simply a modification of that of Grimaux, who was the first to produce codeine artificially.* Hesse,† has indeed claimed priority of discovery, but his claim cannot for a moment be admitted. Even were it proved that Hesse had actually prepared codeine before Grimaux had done so, no priority would be established, as Hesse was not aware that his product was really codeine until long after Grimaux had published his results. Grimaux found that his alkaloid had the same composition, crystalline form, colour reactions, and melting point, as codeine from opium; and although he found a slight difference in specific rotatory power, he rightly concluded that that was due to impurity and that the bases were truly identical. We have determined the rotatory power of the alkaloids prepared as above described, using an alcoholic solution containing 1 gram of base in 11 c.c. at 21°.

Codeine from opium . . .	$[\alpha]_D$	$=-137{\cdot}34°$
Artificial codeine	,,	$=-137{\cdot}38°$

If there remained any shadow of doubt as to the absolute identity of the bases, it is completely removed by the pharmacological results noted below.

The numerous exact descriptions of the physiological action of codeine, given by previous observers, made it unnecessary for us to carry out experiments on animals with the natural alkaloid, and also made it an easy matter to determine that there is an exact similarity of action between it and methylmorphine prepared artificially as above described.

Thus, frogs, with a dose such as 0·005—0·025 grm., given hypodermically in solution, show symptoms of narcosis, passing, after a varying but always comparatively short time, into a condition of greatly increased reflex excitability. With larger doses the narcotic period is considerably shortened and tetanus comes on in a few minutes. The central nervous system only is affected, the peripheral nerves being left intact except as the result of exhaustion.

In rabbits 0·01—0·02 grm. caused well marked, but not very deep narcosis. On increasing the dose the reflex is found to become greatly exaggerated, while with a further increase tetanus is induced and finally death in convulsions.

In dogs, while small doses readily enough produce a narcotic action, the accompanying disagreeable effects so often seen with morphine—salivation, vomiting and diarrhœa—are much more marked than in the case of the latter alkaloid.

Dimethylmorphine, $C_{17}H_{17}(CH_3)_2NO_3$.—This base appears to have been first obtained by Hesse,‡ when treating morphinate of potash with methyl iodide. We found that the best yield was afforded by warming together equivalent quantities of morphine, soda and methyl iodide; then on cooling, additional equivalents of soda and methyl iodide were introduced, and the solution again digested on the water-bath. After evaporating, with addition of water so as to get rid of the alcohol, the solution was exhausted with chloroform. The latter having been removed by evaporation, the residue was converted into hydrochloride by cautious addition of acid. The crystallized salt so obtained was purified by pressure, and recrystallization several times repeated. The hydrochloride of dimethylmorphine has the form of four-sided prisms, which effloresce on exposure to the air. Three different specimens of the hydrochloride when placed in the water-bath lost 8·93, 8·36, and 7·98 per cent. There was no further loss of weight at 140°.

$(C_{19}H_{23}NO_3,HCl)_2\,5H_2O = 9{\cdot}12$ per cent. H_2O for 4 mols.

The chlorine was estimated in the salt dry in the water-bath, by precipitation with silver nitrate in presence of hot dilute nitric acid. There were obtained:—

9·85 per cent. Cl			Required for
9·84	,,	mean	$(C_{19}H_{23}NO_3)_2H_2O$
9·98	,,	9·90	9·90 Cl per cent.
9·95	,,		

The platinochloride was prepared by adding to the aqueous solution of the salt, platinic chloride in slight excess, the precipitate being filtered and washed with cold water. Portion of compound dried at 120° and ignited.

0·280 gram gave 0·0522 gr. Pt = 18·64 per cent.

Portion dried at 140°, ignited:—

0·309 gram gave 0·0576 gr. Pt = 18·64 per cent.

$(C_{19}H_{23}NO_3,HCl)_2PtCl_4 . H_2O = 18{\cdot}65$ per cent.

It was found that the compound dry in water-bath lost no weight at 120°, and not indeed until the temperature was raised to 160°, at which point the salt decomposes, as is manifest by its appearance, and from the fact that the loss in weight is far more than can be accounted for by loss of combined water.

When the solution of dimethylmorphine hydrochloride was mixed with ammonia a viscous precipitate was produced. After two days this precipitate become a mass of prismatic crystals. These were very well defined and all of the same form. After drying on filter paper by exposure to the air the crystals appeared to be anhydrous, as there was no loss of weight at 125°, while at 130°–135° the alkaloid fused without loss of weight.

The preparation, purification, and analysis of these substitution compounds are attended with peculiar difficulties, as we have not only to deal with ordinary impurities but with the risk of the presence of isomers. For instance, methylmorphine methylchloride, dimethylmorphine hydrochloride, and the hydrochloride of methylmorphimethine of Hesse (methocodeine of Grimaux), have the same molecular weight; and consequently a chlorine estimation, and analysis of a platinum compound, could not by themselves distinguish one alkaloid from the other. The simple fact, however, that our salt gave an immediate and bulky precipitate with ammonia, is sufficient to show that it was not methylmorphine methochloride, whose solutions yield no precipitate with alkalies. That the salt was not a mixture is evident, not only from the analytical results, but also because the precipitated and crystallized alkaloid had the same pharmacological properties as the salt. There is a little difficulty regarding Hesse's "methylmorphimethine." Although the process we employed differs from that used by Hesse for the preparation of methylmorphimethine, it is conceivable that we might have arrived at the same result. That possibility seems to be excluded by Hesse's statements that methylmorphimethine melts at 118·5°, and that the muriate contains two molecules of water. Grimaux's description of the physiological effects of methocodeine also indicates that it is a different base from dimethylmorphine. We are not at all clear that Hesse has really determined that in methylmorphimethine one of the hydrogen atoms replaced by methyl is not a hydroxyl

* *Comptes Rend.*, xcii., 1140, 1228, 1881.
† Liebig's *Annalen*, ccxxii., 203, 1884.
‡ *Pharm. Journ.*, [3], xii., 1029.

hydrogen. However that may be, it is certain that the substance we have described as "dimethylmorphine" has the composition of that body, and cannot in the light of our present knowledge be otherwise named.

The chemical change represented in dimethylmorphine completely modifies the symptoms characteristic of the morphine group, so much so indeed that points of similarity are difficult to find.

The hydrochlorate of dimethylmorphine dissolved in water, and dimethylmorphine dissolved in water with the aid of acetic acid were used for the experiments. Both solutions were neutral to litmus paper.

In frogs 5 milligrams caused slight depression, which soon passed off; the animal recovering its normal condition. When 0·01 – 0·025 grm. were given the frog soon showed symptoms of extreme depression, lost its power of jumping and ceased to respond to pinching. The motor nerves remain unaffected, but the brain and spinal cord are greatly depressed. The most prominent effect, however, is poisoning of the muscles. At the point of injection the muscles pass into a state of rigor mortis almost at once, and this condition gradually extends over the whole body, death resulting from poisoning of the muscular system. The action of this body, however, is not comparable to that of members of the digitalis group, being rather allied to the saponin group. The heart is slowed and depressed, but does no pass through the characteristic phases of the digitalis heart.

In rabbits no narcosis was produced even with very large doses. In one case 0·05 grm. caused slight general depression and slowing of the respiration. When 0·5 grm. was given the animal became very depressed and died in eighteen minutes. Death was due to failure of respiration consequent on poisoning of the respiratory muscles. The muscles at the points of injection did not respond even to strong electric currents, those at a distance being, however, quite excitable, and the motor nerves apparently normal.

Ethylmorphine, $C_{17}H_{18}(C_2H_5)NO_3$.—30·3 grms. morphine hydrate were dissolved in methylated spirit with 4 grms. caustic soda, and when the solution had cooled 15·6 grms. ethyl iodide were added (these being molecular proportions). The solution was gently warmed for half an hour and then evaporated. After being diluted with water the solution was exhausted by successive treatment with chloroform. The latter having been got rid of by evaporation, the extract was converted into muriate. The crystals which separated on cooling were pressed and purified by being thrice recrystallized from water with charcoal to decolorize. The hydrochloride was obtained in minute prismatic crystals, free from colour. These were dried by exposure to the air, then in water-bath, and finally in air-bath at 120°.

	Per cent.	Calculated.
Loss of weight under 100° =	4·48	4·46
„ „ at 120° =	6·61	6·69

These numbers indicate that the formula of ethylmorphine hydrochloride is $(C_{19}H_{23}NO_3.HCl)_2.6H_2O$, two molecules of water being driven off at the temperature of a water-bath, three at 120°, the remaining molecule being retained even at a higher temperature.

The chlorine was estimated in the same manner as formerly described.

		Calculated.
Found in the air-dry salt .	8·80 per cent.	8·79
„ „ salt dry at 120°.	9·87 „	9·90

The platinochloride was prepared in the usual manner. It was found to be very soluble in water, and was therefore washed with alcohol, in which, however, it is by no means insoluble. When dry in the water-bath 0·2605 grm. gave 0·0495 grm. Pt on incineration, = 19·00 per cent. 0·3098 grm. gave 0·0588 grm. Pt = 18·98 per cent. 0·433 grm. gave 0·0822 grm. Pt = 18·98 per cent.

Mean of three estimations = 18·98 per cent. Pt

$(C_{19}H_{23}NO_3.HCl)_2\,PtCl_4$ = 18·97 „ „

The hydrochloride of ethylmorphine is extremely soluble in water, so that after the various operations of purifying, the yield of crystals is very small. It will be noted that the platinochloride is anhydrous at 100°, in which respect it differs from the corresponding compound of dimethylmorphine.

The action of this body has been briefly described by Bochefontaine (*Comptes Rend.*, xciii., 1881), who ascribes to it a purely tetanizing action. This, however, is due to the fact that he used only very large doses, thereby completely masking the preliminary narcotic effect, which we have found it to possess.

Our observations show that its action is exactly similar in every respect to that of methylmorphine, and that, therefore, so far as physiological effect is concerned, it is immaterial whether methyl or ethyl replace the hydrogen atom in morphine. To avoid repetition we omit, at the present time, the details of our experiments on animals.

Diethylmorphine, $C_{17}H_{17}(C_2H_5)_2N_2O_3$.—Several experiments were made with the object of preparing the diethyl compound by the same method as dimethylmorphine, but without success. In each case ethylmorphine and its additive compound were the principal products. We therefore endeavoured to form diethylmorphine by heating in a sealed tube molecular proportions of morphine, soda and ethyl iodide. 15·15 grm. morphine, 4 grms. sodium hydroxide, and 15·6 grm. ethyl iodide were dissolved in dilute alcohol, the solution introduced into the tube, and the latter sealed and kept in boiling water for two hours. On opening the tube after it had cooled there was a slight escape of gas. The contents were evaporated and the residue exhausted with chloroform. When the chloroform had been driven off the viscous residue was washed thrice with warm water, then stirred with alcohol and ether, and otherwise treated to cause crystallization, but no crystals appeared, even after three days. The substance was then mixed with hot water, and hydrochloric acid added to acid reaction. On cooling, the solution only crystallized to a small extent, and as with platinic chloride the crystals indicated a molecular weight of 1070 it is evident that they were a mixture. The fact that the crystals gave a well-marked iodine reaction shows that they consisted in part at least of ethiodide. Therefore, the crystals having been removed the mother-waters were mixed with excess of sodium carbonate, and the viscous precipitate washed several times with warm water. The precipitate was converted into hydrochloride, which even after evaporation of the solution to a syrupy consistence refused to crystallize. As the solution still indicated traces of iodine it was diluted, digested with charcoal, filtered, and mixed with excess of sodium carbonate. The precipitate remained absolutely non-crystalline. It was washed until free from iodine compounds, and then again converted into muriate. From this solution the platinochloride was prepared by precipitation, the latter soluble salt being washed with small quantities of water and dried in the water-bath. On ignition:—

0·1122 grm. gave 0·0202 grm. Pt = 18·00 per cent.

$(C_{21}H_{27}NO_3.HCl)_2PtCl_4$ = 18·00 „ Pt

Whence it is manifest that our solution contained either diethylmorphine or an alkaloid having the same molecular weight, or a mixture of such bases. As we have not up to the present time succeeded in obtaining either the base or one of its salts in the crystalline form it would be impossible to assert that the solution contained nothing but diethylmorphine. Considering, however, the manner of its formation, and the molecular weight indicated by the platinum compound, there is very strong ground for believing that the viscous precipitate above described consists essentially of diethylmorphine. It was suspected from the pharmacological observations that the substance contained ethylmorphine ethohydroxide, but that ought to have been entirely removed by the repeated washing with water. Neither the amount of material, nor the time at our disposal admitted of the matter being cleared up, so that it is left for future investigation

along with other points that have emerged in the present inquiry.

Acetylmorphine, $C_{17}H_{18}(C_2H_3O)NO_3$.—This compound was first prepared by Wright,* who named it "diacetylmorphine," on the assumption that the formula of morphine is double that usually ascribed to it. Without expressing any opinion on that point, we use the name "acetylmorphine," as more convenient, and consistent with the formulæ used elsewhere. Fifteen grams morphine hydrate were added to 30 grams glacial acetic acid, and the solution boiled for seven hours, the flask being attached to an inverted condenser. The solution was then diluted, ammonia in slight excess added, and the acetylmorphine extracted in manner as described by Dr. Wright. The hydrochloride was purified by recrystallization, and the platinum salt formed therefrom in the usual way. After drying in the water-bath,—

0·2555 grm. gave 0·0457 grm. Pt=17·88 per cent.

$(C_{19}H_{21}NO_4.HCl)_2.PtCl_4.2H_2O$ Pt=17·87 „

Hydrochloride of acetylmorphine is sparingly soluble in water, so that it is necessary to make a solution of the acetate for hypodermic administration.

The introduction of acetyl into morphine alters the action of the latter very slightly qualitatively, but quantitatively both the narcotic and the tetanizing action are developed with rather smaller doses. Thus with 0·01 grm. frogs exhibit perfectly the two stages, a similar dose of morphine being quite insufficient to give a characteristic train of symptoms, slight lethargy only being produced. With a somewhat larger dose—0·02 grm—tetanus supervenes in a few minutes, the narcotic stage being extremely short. The fatal dose for frogs ranges from 0·015 to 0·02 grms. With such doses the heart is only slightly slowed. In rabbits 1 mgrm. is sufficient to produce slight narcosis lasting for two or three hours, the animal having the appearance of being fast asleep. During this time the respirations fall from about 120 to sometimes as low as 12 per minute, the heart remaining unaffected. Larger doses deepen and prolong the narcotic effect, while if we ascend to slightly over 1 decigram, death occurs with tetanus. The action, therefore, is very similar to that of methyl- and ethylmorphine, and it is probable that in all three bodies, the same atom of H is replaced by the radical. The acetyl substitution body, however, appears to be more active than either of the others.

We are continuing this investigation on the effect of substitution of alcohol and acid radicals in morphine, and we propose extending the inquiry on similar lines to other alkaloids.

The PRESIDENT, in moving a vote of thanks to the authors of this paper, said it presented the result of the combined work of a scientific chemist and a scientific therapeutist. It was impossible to do justice to such a paper by merely listening to it; it was so elaborate, and was the result of such an enormous amount of experimentalization that he was sure it would receive from those who were working in this direction the attention it deserved. One could not help thinking sometimes with regard to these other derivatives of opium that as in family life a strong boy or a very beautiful girl might sometimes obscure the merits of other humbler and lesser-known members of the family, so morphine and codeine had monopolized a large amount of attention to the exclusion of these lesser-known, but much deserving characters, who certainly had at least the merit of exceedingly long and hard names.

Mr. BALKWILL said it had occurred to him in listening to this communication that it would be of great assistance to the members if these papers could be printed in sufficient number to be distributed through the room, so that members could follow them as they were read, and make notes upon them. He had laboured under the disadvantages of catching a few very interesting remarks here and there, but that was all, so that he could not venture to offer any observations on the paper itself.

Dr. THRESH said the printed slips Mr. Balkwill had seen were simply proofs kindly supplied by the Editor of the *Pharmaceutical Journal* for the convenience of the authors and officials at the Conference. The question now raised had been mooted at different times, but the expense that would be involved in providing independently copies of the papers sufficient for all attending the Conference would be so considerable that he did not think the Conference could afford it. No doubt if it could be done it would be a decided advantage.

Mr. LONG said it was perhaps rather an ungracious suggestion to make from those who did not contribute scientific matter, but if it were possible for gentlemen to send their papers in two or three weeks before, so that they might be published in the Journal and read before the Conference was held, the members would be in a much better position to deal with them.

Mr. NAYLOR said there was one point with reference to the experiments on the formation of diethylmorphine. He did not catch any statement as to the length of time which the morphia and iodide of ethyl were heated together in the sealed tube.

Mr. DOTT said they were heated together for two hours. He need only add that Dr. Stockman would have been very pleased to be present, but he had to go to America.

(*To be concluded.*)

* *Chem. Soc. J.*, [2], xii., 1033.

Obituary.

Notice has been received of the death of the following:—

On the 17th of August, Mr. George Ackrill, Chemist and Druggist, Tudorville, Ross. Aged 69 years.

On the 2nd of September, Mr. Henry Gooch, Chemist and Druggist, Framlingham, Suffolk. Aged 82 years.

On the 19th of September, Mr. George Trilfield, Chemist and Druggist, Nuttall Street, Wavertree Road, Liverpool. Aged 62 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

"MENTHOL WITH ACONITINE."

Sir,—Mr. Baily, who writes under the above heading in to-day's Journal, is mistaken in thinking that a combination of menthol with aconitine is "novel," though its value is beyond doubt.

May I state, on behalf of Mr. W. Cadwaladr Jones, of Bayswater, that as far back as 1882 he carried out a long series of experiments on the human subject with mixtures of the two of different strengths, and that for the last four years, under a fancy title, a compound of aconitine and menthol in sticks has been prepared and sold by him, a large proportion of the sales being for export to the colonies?

I would add that except for use under direct medical supervision it was deemed expedient to greatly reduce the proportion of aconitine, as it was found that even a label covered with warnings was insufficient to prevent some purchasers rubbing it on the gums and the inside of the mouth.

23, *Bayswater Terrace, W.* W. L. LONGSTAFF.

[*** As we are not aware that Mr. Baily had been preceded in the publication of information respecting the combination of menthol with aconitine, we consider he was quite justified in his use of the term "novel."—ED. PHARM. JOURN.]

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tichborne, Hooper, Mitchell, Nicol, Williams, Moss, Indagator, G. W. W.

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6. **Because, in many instances, they obviate the necessity of stocking three or more preparations of the same drug.**
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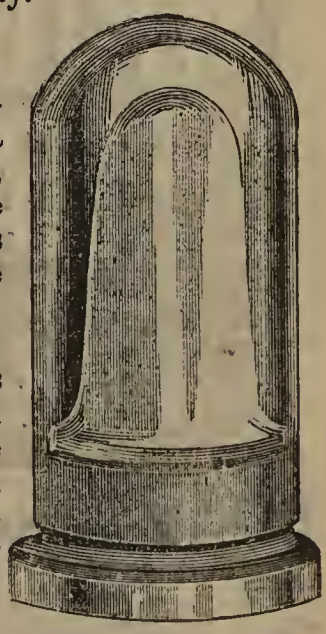

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Samples of any kind for 2 stamps.
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The London Hospital and Medical COLLEGE, Mile End, E.

The SESSION 1887-88 will commence on Saturday, October 1st, 1887. The New Buildings, which were opened by T.R.H. The Prince and Princess of Wales, on May 21st, afford more than double the accommodation which was provided formerly.

FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20 will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All Resident and other Hospital Appointments are free, and the holders of all the Resident Appointments are provided with rooms and board entirely free of expense. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, one Accoucheurship, and one Receiving-room Officer; Dressers and Maternity Pupils also reside in the Hospital. Special Classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London, and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England, are held throughout the year. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, Metropolitan District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply, personally or by letter, to MUNRO SCOTT, Warden.

St. Thomas's Hospital Medical School,
Albert Embankment, London, S.E.

The WINTER SESSION of 1887-88 will commence on OCTOBER 1, when an Introductory Address will be delivered by R. W. REID, Esq., F.R.C.S., at 3 p.m.

Two entrance science scholarships of 125 guineas and £60 respectively, open to all first-year students, will be offered for competition. The examination will be held on the 3rd, 4th, and 5th of October, and the subjects will be chemistry and physics with either botany or zoology, at the option of Candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

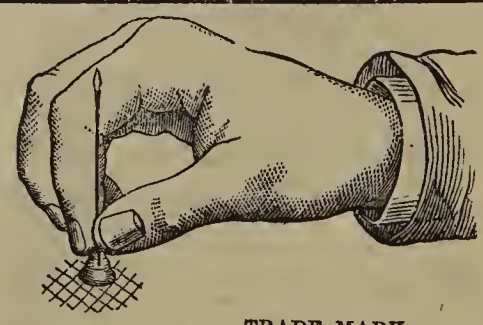
All Hospital appointments are open to students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several medals.

The fees may be paid in one sum or by instalments. Entries may be made to lectures or to Hospital practice, and special arrangements are made for students entering in their second or subsequent years, also for dental students and for qualified practitioners.

Several medical practitioners and private families residing in the neighbourhood receive students for residence and supervision, and a register of approved lodgings is kept in the secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.
R. W. REID, Vice-Dean.



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HUMAN VACCINE, from healthy children only, microscopically examined and source quoted.—Three tubes, two-thirds full, 5*s.*; Tubes one-third full, and Lancet Charged Points, 1*s.* each; Pin-points, 1*s.* 1*d.* each. Eighteen Charged Small Points, 5*s.*
Tubes two-thirds full (same as those mentioned above, bu without source), in quantities for export, £5 per 100 tubes.

Pin-points, uncharged, 1*s.* per dozen.

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The next course of Lectures for Minor Students who intend entering for the December or February examination will commence on Monday, October 24th. Fee to December, 6 guineas; to February, 10 guineas.

EVENING CLASSES

For Minor Students are now being held on Monday, Wednesday, and Friday evenings. For Prospectus, apply to

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ESTABLISHED 1ST OCTOBER, 1868.

THE TWENTIETH SESSION, 1887-8,

Commenced on the 12th September. A few vacancies will occur on the 15th October.

For Fees, &c., apply to W. BAXTER, Secretary.

THE LIVERPOOL SCHOOL OF PHARMACY,

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Principal—Mr. J. S. WARD, M.P.S., Ph. Ch.,

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The pass list increases every session. . . . 48 °/₀ of the successful Minors have passed at their first attempt. . . . During the last session all the Major and all the Preliminary pupils sent in passed.

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Assisted by an efficient Staff of Teachers.

The next Term will commence on Monday, October 24th.

Students can enter at any time, but are advised to commence their Studies at the beginning of a Term.

Fees { To the December Examination ... £6 6s. ; „ February „ ... ... £9 9s. ; 12 Months' Course (Minor and Major), £15 15s.

Preliminary Classes Daily.

FEE—ONE GUINEA PER MONTH.

EVENING CLASSES

Thursdays, for the October Examination.
Tuesdays, „ December „
Wednesdays, for Beginners. Fees very moderate.

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That Messrs. Wills and Wootton, in their respective departments, are not only 'lecturers' and 'monitors,' but teachers in the truest sense of the word, is abundantly evidenced by the record of accomplished facts, and by the sterling value of the manuals and text-books employed, several of which have been critically reviewed in the pages of this magazine."—*Magazine of Chemistry.*

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ESTABLISHED IN 1878.

This Institution offers special advantages to Pharmaceutical Students. Lectures and practical instruction are given during the session in all the subjects of the Minor and Major examinations of the Pharmaceutical Society.

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The next session will be opened on 3rd October.

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OF PHARMACY,
225 and 227a, OXFORD ST., MANCHESTER.

A ONCE-A-WEEK CLASS,

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It takes all the Subjects taught. Fee to July, £6 15s.

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The WINTER SESSION, 1887-88, will commence on Wednesday, the 5th October, when a Preliminary Examination will be held. Prospectus on application to the Secretary.

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The Pharmaceutical Journal AND Transactions.

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OF THE

Pharmaceutical Society of Great Britain.

Distribution of Prizes and Inaugural Sessional Address.

At the Evening Meeting of the Society
On Wednesday next, October 5th, 1887,

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ADDRESS TO THE STUDENTS

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Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

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Professor ATTFIELD .....PRACTICAL CHEMISTRY.
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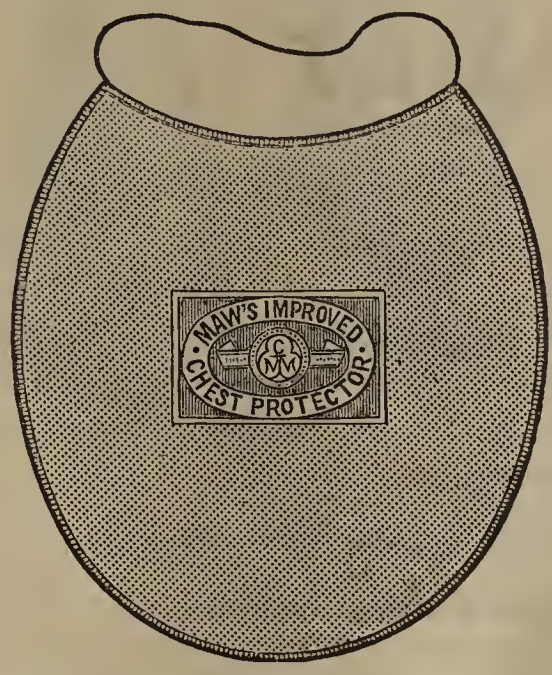

Fig. 4.
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Fig. 5.
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Fig. 4. Single	„	9/	11/6	13/6	16/
Ditto, perforated	„	11/	14/	16/	19/
Fig. 5. Vests „	„	27/	34/	42/	51/

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Ditto, second	„	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet	„	17/	22/	27/	33/	40/

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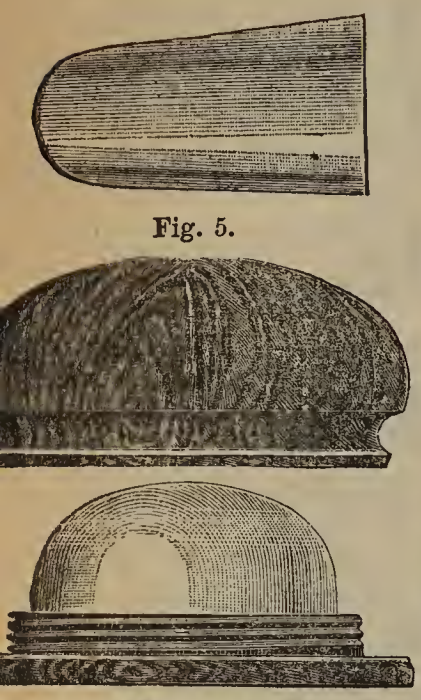

Fig. 1. Fig. 3. Fig. 4. Fig. 6. Fig. 7. Fig. 8.

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,, ,, ,, Vinaigrette style (oval bottles), 30 in each	6d.	4/6
,, ,, ,, 100 in bottle	1/6	12/6
Potash Chlor. with Borax, Beautifully graven white metal boxes, pink silk label, 30 in each ...	6d.	4/6
,, ,, ,, Vinaigrette style (oval bottles), 30 in each	6d.	4/6
,, ,, ,, 100 in each	1/6	12/6
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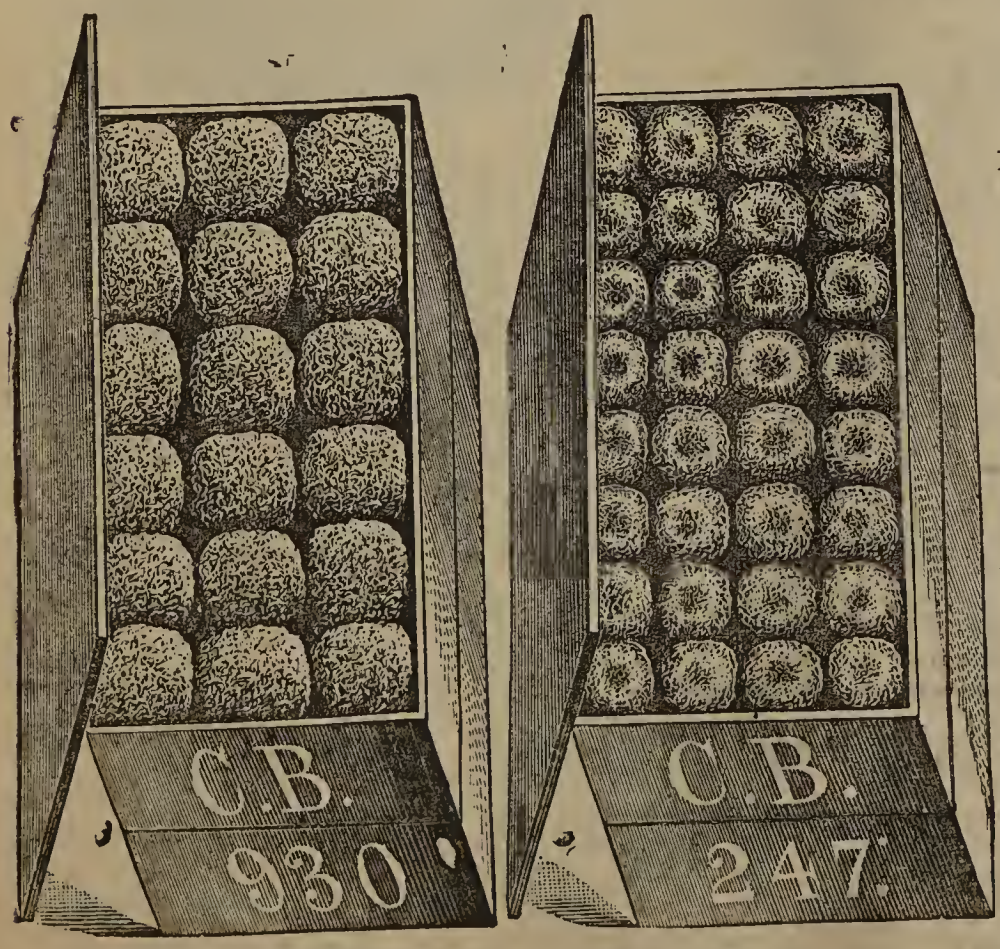

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		FINE TURKEY SPONGES.		
14	1st	Finest selected Cups, assorted sizes	110	360/
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18	2nd	Do. do. ..	60	140/
19	2nd	Do. Bath sizes ..	35	180/
20	3rd	Finest Cups, assorted sizes ..	110	180/
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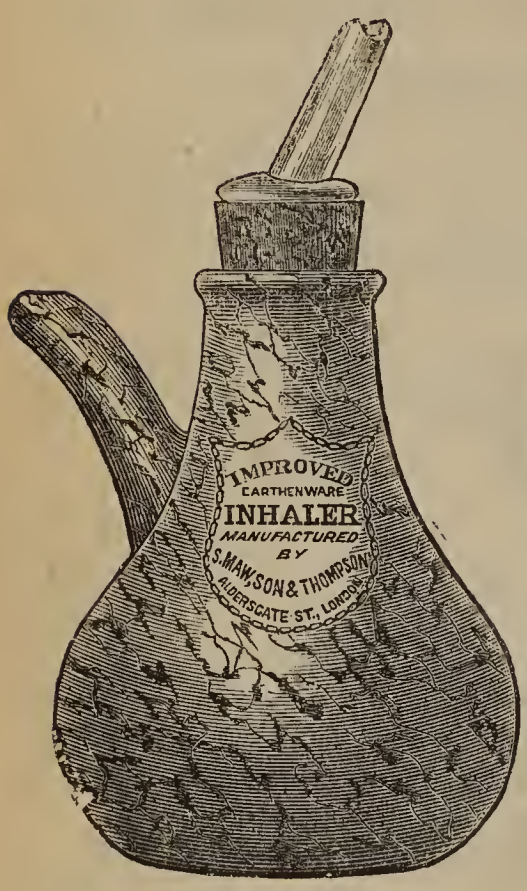

FIG. 8.
MAW'S IMPROVED.

FIG. 6.
MAW'S DOUBLE-VALVED.

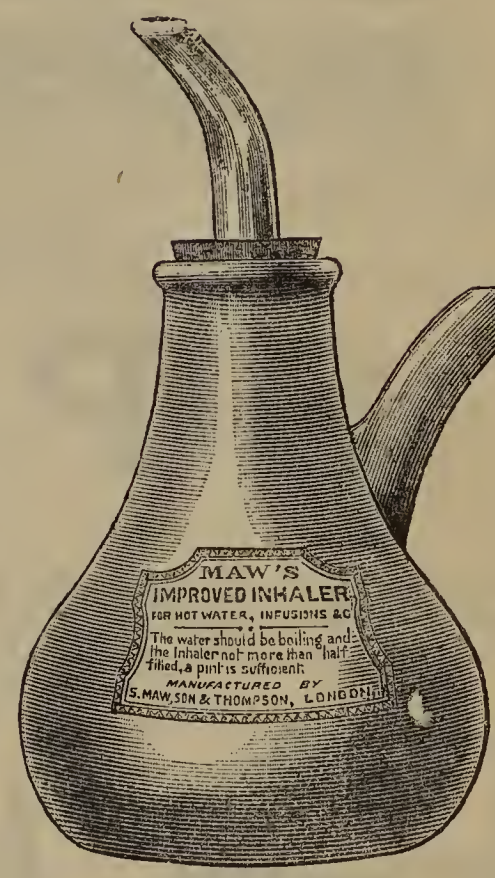

FIG. 8A.
MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.

Fig. 8.—Marbled, 32s. per dozen. Fig. 8a.—White, 21s. per dozen.

ELASTIC TUBES, with Mouthpieces, to fit Fig. 8 and 8a, 7 inches long, 8s. per doz.; 9 inches long, 12s. per doz.

SPECIAL QUOTATIONS TO WHOLESALE BUYERS.

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"THE MONTH."

A number of papers of chemical and pharmaceutical interest appear to have been read before the Pharmacy Section of the Society of German Naturalists and Physicians during its recent meeting at Wiesbaden (*Pharm. Zeit.*, Sept. 24). Of considerable practical importance was a communication on Menthol and Borneol, by Dr. Beckmann. According to some previous statements the solid portion of Japanese peppermint oil consists of menthol ($C_{10}H_{20}O$), and the liquid part consists of a solution of menthol in a hydrocarbon that has been named "menthen" and represented by the formula $C_{10}H_{16}$; whilst according to other statements the solvent is an isomer of menthol. But Dr. Beckmann ascertained the solvent liquid to have a composition represented by the formula $C_{10}H_{18}O$, and to be identical with menthon, a compound obtained by Messrs. Morrigan and Atkinson in the oxidation of menthol. The residual liquor after the removal of the solid menthol still contains usually about two-fifths of its weight more dissolved in the menthon, a quantity very desirable to recover in view of the greatly increased value of menthol consequent upon the demand for cone making, but the similarity in the boiling points of the two compounds—menthol 211° C. and menthon 206° C.—renders their separation by ordinary means impracticable. Experiments showed, however, that by the action of hydroxylamine upon menthon it is converted into oximidomenthon ($C_{10}H_{18}{=}N.OH$), and as this compound is soluble in dilute sulphuric acid, it can be easily separated, and the 40 per cent. of menthol thus recovered. Some experiments were next made as to the possibility of converting menthon into menthol economically, and eventually it was found that menthon in ethereal solution in the presence of the theoretically requisite quantity of sodium is converted into menthol in the cold. This discovery has the more practical importance because menthon is the constituent giving to peppermint oil a pungent taste and disagreeable odour, and by this process of reduction inferior qualities of peppermint oil are made passable, and are sent out as "improved Japanese oil of peppermint." Dr. Bergmann stated also that ordinary laurel camphor treated similarly is converted into borneol.

Menthol and Borneol.

It will be remembered that some time since Professor Eykman announced that he had separated from "Japanese belladonna root" (*Scopolia japonica*) an alkaloid, resembling atropine, which he named "scopoleine," and under that designation a brown syrup has since been supplied in commerce as a mydriatic alkaloid. According to Professor Schmidt, of Marburg, however, the scopolia root contains no new alkaloid; but atropine, hyoscyamine and hyoscine occur in the root in very varying proportions, so as to suggest that the conditions of growth and the time of collection essentially influence the relative quantities of the alkaloids. Professor Schmidt is even inclined to think that under certain conditions these three alkaloids may be converted one into another in the plant, and in support of this he recalls Professor Ladenburg's statement that when tropine and tropic acid derived from the decomposition of hyoscyamine are recombined the product is not the original alkaloid, but its isomer atropine. Hyoscyamine was also found in the root of a cultivated species, *Scopolia Hartnackiana*, and both roots yielded "scopoletin," a fluorescent compound, identical with the methylesculetin occurring in belladonna root. Professor Schmidt also disputes the basic character of the substance hitherto known as "rotoine," which he thinks is more likely a compound of alkali with a fatty acid very rich in carbon,—a soap, in fact,—and ought therefore to be struck off from the list of alkaloids.

Scopolia Alkaloids.

Professor Schmidt also gave some further information respecting the remarkable resemblance of hydrastine to narcotine in its behaviour to oxidizing agents. Last year (*Pharm. Journ.*, [3], xvii., 427), Messrs. Freund and Will stated that upon treating hydrastine in acid solution with oxidizing agents it splits up into opianic acid and a base closely resembling cotarnine, which appears to have been since named hydrastinine. Professor Schmidt now states that if the oxidation be effected in alkaline solution the decomposition goes further, the products being hemipinic and nicotinic acids. Notwithstanding this complete correspondence in behaviour, all attempts to convert hydrastine into narcotine, or *vise versâ*, have hitherto failed. It is further affirmed by Professor Schmidt that although hydrastine crystallizes from acetic ether in very large crystals, it does not form any well crystallized salts except the picrate, the salts being usually of syrupy consistence, drying up to a horny substance of inconstant composition. He therefore infers that the commercial salts of hydrastine are not of constant composition, and probably are mostly basic compounds.

Hydrastine.

With berberine and its salts the conditions are exactly reversed, the alkaloid being difficult to obtain in a crystalline form, whilst its salts are readily crystallizable. On this ground Professor Schmidt questions the character of the substances described in price lists as "berberinum purum," which he is reported to have stated always contain chlorine (*Pharm. Zeit.*, Sep. 24, p. 542). He says that berberine has a remarkable power of combining with solvents, such as alcohol, ether, chloroform and acetone, to form crystalline compounds. Thus berberine and chloroform, in the proportion of one molecule of each, form a beautiful crystalline body, which is not a simple addition product, since it is permanent at 100° C., and by acids is decomposed not simply into berberine and chloroform, but decomposition products of the latter. Berberine can also combine with a second molecule of chloroform, but this behaves like water of crystallization.

Berberine.

From *Aconitum Lycoctonum* two alkaloids, lycaconitine and myoctonine, have been obtained, but hitherto their formulæ have not been satisfactorily settled, some analyses having indicated a remarkably high figure for nitrogen. Professor Dragendorff states that recent investigations have shown that this large quantity of nitrogen is attributable to these bases, but it has also been ascertained that at a temperature of 60° C., decomposition takes place with a separation of a nitrogenous constituent (? NH_3). Neither the bases nor their salts are crystallizable, and both bases resemble curare in physiological action. Professor Dragendorff also mentioned that aconitine has been found by Herr Jurgens to be convertible into picraconitine. The latter appears to stand midway between aconitine and aconine, since aconitine minus a benzoyl residue (C_6H_5CO) equals picraconitine,

Aconite Alkaloids.

while minus two benzoyl residues it equals aconine. It has been ascertained, however, that in the decomposition of aconitine not only benzoyl groups, but a methyl residue is split off.

Glands of Labiatæ and Compositæ.

Dr. Tschirch, of Berlin, in a paper on the receptacles of secretion in plants, and the origin of some secretions, pointed out that the epidermal glands on the leaves, flowers and stalks are of two distinct types in the *Labiatæ* and *Compositæ*, so that they might serve as diagnostic of these two natural orders. In the *Labiatæ* the epidermal glands have in their interior a compact circle of secreting cells, which are always in a multiple of four, and are usually eight or sixteen in number. The upper cell of the gland is also divided by radial walls perpendicular to its surface. The glands of the *Compositæ*, on the other hand, have superimposed layers of secreting cells, though the term is often only strictly applicable to the two uppermost. The whole of the secreting cells are divided in two by a median radial wall, which is usually at right angles to the longitudinal axis of the organ. The number of secreting cells is consequently four, in two layers, or six in three layers. Seen from above the oil glands of the *Labiatæ* show a circle of usually eight cells around a central one, whilst those of the *Compositæ* exhibit a long oval cell divided in the middle of the gland.

Copaiba Balsam.

Professor Tschirch considers that balsam of copaiba originates in the trunk by the destructive metamorphosis of the walls of the vessels and then of the contiguous wood cells, cavities being thus formed which gradually enlarge. This metamorphosis is seen to take place in the inner wood of twigs of only a year old.

Cryptocarya australis.

The physiological action of *Cryptocarya australis* has lately been investigated by Dr. Bancroft, of Brisbane. This small tree belongs to the natural order Laurineæ, and is plentiful about Brisbane. The bark has a persistently bitter taste, due to the presence of an alkaloid which crystallizes from its solution in stellate masses of acicular crystals. When administered to warm-blooded animals the alkaloid produced difficulty of respiration, ending in asphyxial difficulty and death. It also had a poisonous action on cold-blooded animals belonging to the reptilia.

Daphnandra repandula.

Another Queensland plant examined by Dr. Bancroft is *Daphnandra repandula*, belonging to the same natural order. The bark of the tree has a transient bitter taste, and when first removed from the tree it has a yellow colour on the inner surface, which changes to a metallic black on exposure to the air, but becomes yellow again when dry. Infusions of the bark are of a yellow colour and remain free from microscopic organisms when kept. The extract of the bark does not appear to contain either gum or resin, but is rich in alkaloids. The extract is very poisonous, one grain being a fatal dose for a frog and ten for warm-blooded animals. The alkaloids contained in the bark are colourless when pure, and crystalline. The active one is easily separated from the others, being soluble in water. Its poisonous action is chiefly due to its action on the heart. To some extent it is antagonistic to strychnia. The poison powerfully affects fish, mollusks and infusoria. When applied topically to voluntary or involuntary muscles it paralyses them rapidly. Dr. Bancroft has remarked that it also retards the development of septic organisms and that it will deodorize putrid meat. It checks the growth of yeast, and kills some water plants. Another species, *D. micrantha*, which is a shrub, and also grows near Brisbane, possesses a similar active principle.

Acacia delibrata.

A third Brisbane plant which Dr. Bancroft has examined is *Acacia delibrata*, in the pods of which he has found a saponin. Physiologically it was found to act as an irritant poison. It has a very disagreeable taste and is soluble both in alcohol and in water (*Australian Journal of Pharmacy*, p. 104).

New Remedies.

In the *Lancet* (Sept. 24, p. 604) Mr. E. Hurry Fenwick gives a brief but valuable account of the results obtained by him from the use of several of the more recently introduced remedies in the treatment of genito-urinary diseases in St. Peter's Hospital. Kola paste, made like chocolate, he has found useful in cases where large doses of iodide of potassium have to be administered. The tincture of *Lycopodium clavatum* is, he states, of real value in irritable bladder and cystospasmus where not dependent on actual disease or the presence of a foreign body. Kava kava he considers to be inferior to copaiba and to sandal oil, but much more pleasant to take. *Stigmata maidis* is of great value in renal colic and pyelitis, also in chronic but not in acute cystitis. Papain was found beneficial in the treatment of syphilitic ulcers of the tongue and throat, especially when mixed with cocaine. *Fabiana imbricata* is of undoubted value in lithiasis and renal stone; one patient received so much relief from its use in hæmaturia and pain that he obtained the plant direct from Peru every mail. Naphthalene is given with benefit in fetid urine, three grains being the dose found most useful. The urine smells of phenol after the patient has taken naphthalene and remains without change for several days, even if exposed to the air. Ulexine, although a powerful diuretic, must be employed with caution in stricture, one-tenth of a grain having caused temporary suppression of urine, vomiting and fever. Strophanthus has been found valuable in preventing rigors after instrumentation. A liniment of chaulmugra oil was found of value in gonorrhœal rheumatism, its action being increased by the addition of lanolin. Damiana proved of service in melancholia and depression when of genito-urinary origin.

Dioxynaphthalene.

The search for new remedies among the carbon compounds does not at present show any sign of relaxation, and one of the latest to be credited with useful therapeutic properties is "dioxynaphthalene," $C_{10}H_6(OH)_2$. There are at least six compounds known that have the composition of dioxynaphthalene, or, as it is sometimes written, dihydroxynaphthalene, but the melting point mentioned, 186° C., is that of one prepared by fusing naphthalene-disulphonic acid with potassic hydrate. According to Dr. Lépine (*Archives de Pharm.*, Sept. 5, p. 403) this compound, administered to æsthenic persons in 25 centigram doses, with a maximum daily dose of 1 gram, has a remarkable effect in imparting energy, though without augmenting reflex action or increasing muscular power. Larger quantities, however, appeared sometimes to produce weakening effects, and in two cases cyanose followed the administration of one gram.

As the hydroxyl group has been credited with the property of augmenting the energy of a radical with which it may combine, and since the formula of dioxynaphthalene differs from naphthol ($C_{10}H_7.HO$) in containing another HO group, Dr. Lépine was induced to experiment as to whether there might be any analogy in the physiological action of the compounds. His results were affirmative, and Dr. Lépine says that β-naphthol is capable of producing the same æsthenic effects as dioxynaphthalene, but the dose required, two or three grams, causes irritation to the digestive and other organs.

Morphine Phthalate.

"King of the morphine salts" is the modest claim put forward by Herr Bombelon on behalf of morphine phthalate (*Pharm. Zeit.*, Aug. 27, p. 488), as being free from the defects of the compounds of the alkaloid with the mineral acids and with acetic acid and especially suitable for subcutaneous injection. Morphine phthalate being non-crystalline it requires to be prepared with very pure material, and with this object Herr Bombelon recommends that the alkaloid should be obtained by first precipitating pure morphine hydrochlorate with caustic ammonia, washing and pressing the precipitate, dissolving it in acetic acid, and then again precipitating, washing and pressing it. This pure morphine should be added to hot solution of phthalic acid, in which it is very soluble, as long as none remains undissolved, and the solution, after cooling, filtered and evaporated, finally upon glass. The handsome glassy scales thus obtained are described as being very soluble, the salt only requiring about 5 parts of water; the preparation therefore allows of the use of very strong solutions of the alkaloid. Dilute solutions are said to remain unaltered and without fungoid growth. Herr Bombelon states that phthalic acid forms with other alkaloids salts that are very soluble and permanent.

Fluorine Compounds as Antiseptics.

In a paper read before the Chemical Section of the British Association at Manchester, Mr. W. Thomson called attention to the remarkable antiseptic properties possessed by some fluorine compounds, especially by the fluorides and fluosilicates of sodium, potassium and ammonium. Of these he considers the fluosilicate of sodium best suited for a general antiseptic, it being non-poisonous and without odour; moreover it has only a slightly saline taste and might, therefore, he suggests, be employed in the preservation of food. Sodium fluosilicate is soluble in water to the extent of 0·61 in 100; but according to Mr. Thomson such a saturated solution is not irritating to wounds, whilst it possesses greater antiseptic properties for animal tissues than a 1 in 1000 solution of perchloride of mercury, which could not be ordinarily employed for surgical purposes without producing poisonous effects.

Iodol and Iodoform.

The results of a series of comparative experiments with iodol and iodoform have been made known by Herr Robinsohn (*Chem. Zeit.*, Sept. 18, p. 222). Judging from the observation that when iodol is used iodine may be found in the urine for a considerable time, Herr Robinsohn concludes that the absorption of iodol is very slow and gradual, being only in proportion to the gradual separation of iodine, and that, in fact, the difficultly soluble iodol is not absorbed at all as such. It was found that in large doses iodol is undoubtedly poisonous, but apparently less so than iodoform. The antiseptic value of unaltered iodol proved to be small, and below that of iodoform; but it remains to be ascertained whether iodol finds in wounds and sores more favourable conditions for the separation of free iodine, and therefore for the development of a more energetic antiseptic action. Lastly, iodol does not interfere with the artificial digestion of albuminoids.

Gaseous Enemata.

The use of enemata of sulphuretted hydrogen in the treatment of phthisis, as recommended by Dr. Bergeron, has been found occasionally to give rise to colicky pains and irritation. This is attributed by Mr. Kennedy (*Pharm. Record*, Sept. 1, p. 233) to the use sometimes in the preparation of the gas of sodium sulphide containing a little hyposulphite, which, when decomposed by carbonic acid, gives rise to a corresponding quantity of sulphurous acid.

Peptonized Serum for Hypodermic Injections.

The use of solution of peptones as a vehicle for the hypodermic injection of mercurial and other compounds has been frequently attended by grave inconveniences, which M. Raynaud proposes to avoid by using a liquid less foreign to the blood with which it will have to mix (*Archives de Pharm.*, Sept. 5, p. 386). For this purpose he prepares a peptone of blood albumen by digesting together for seventy-two hours at a temperature of 46° C., 5 grams of pure blood albumen, 75 grams of dialysed pepsin, 75 grams of distilled water and 19 drops of hydrochloric acid. The resulting clear liquid is not rendered turbid by potassium ferrocyanide, and contains about 4 grams of peptone, with a small quantity of syntonin, salts, etc. It is purified by dialysis, concentrated and evaporated on glass, when it forms pale shining, hygrometric scales. Upon dissolving the scales in distilled water and precipitating with absolute alcohol, the peptone is thrown down as a white powder.

Croton Oil.

In referring to the conflicting statements that have been made concerning the active constituent or constituents of croton oil (see *Pharm. Journ.*, [3], xvii., 881), the Editor of the *American Druggist* (Sept., p. 174) says that the statement of Senier as to the solubility of the oil and its activity increasing with age has been confirmed by therapeutic observations made in Bellevue and other New York hospitals. In seeking for an explanation and upon the presumption that change in ageing would be merely one of oxidation, the experiment was made of treating croton oil with permanganate of potassium in aqueous neutral as well as alkaline solution. As a result a quantity of resin was formed, which was found to be nearly inert, but the residuary oil after purification proved to be rather more active than the original oil.

Oil of Allium ursinum.

The volatile oil of *Allium ursinum* has been examined by Dr. T. W. Semmler, who finds that its chief constituent is vinyl sulphide $(C_2H_3)_2S$, but that it also contains a polysulphide of vinyl and a very small quantity of a mercaptan and an aldehyd (*Annalen der Chemie*, p. 149).

Belladonna Leaves.

Some experiments on the relative value of fresh and of dried leaves of belladonna for the preparation of the extract have been made by Mr. A. Bilteryst, of Braine-le-Comte (*Journ. de Pharm. d'Anvers*, p. 411). He finds that a kilogram of fresh leaves, gathered when the flowering had just commenced, yielded 20 grams of extract, and that the same quantity of leaves yielded

when dry 142 grams of dried leaves. Taking 142 grams of dried leaves he found that they afforded exactly the same amount of extract, viz., 20 grams. Operating, however, on 140 grams of the dried leaves as met with in commerce he obtained 21 grams of extract. The extract made from the fresh leaves, according to the directions of the Codex, had a greenish-brown colour, and that prepared from the dried leaves a reddish-brown colour. Both were very hygroscopic. He found that the extract prepared according to the Codex, from fresh leaves, contained at least 12½ milligrams of atropine per gram. The extract obtained from the dried leaves of commerce, however, contained only 5 milligrams per gram. He attributes this result to the fact that the commercial leaves were collected when part of the active principle had passed into the berries, some of the latter having been found among the leaves.

Opium in China.

In the course of a journey through Manchuria, Mr. H. E. M. James, of the Bombay Civil Service, noticed that the opium poppy grows luxuriantly in that part of China, and that the native grown opium had there almost completely ousted the Indian drug. The imports of the latter into Manchuria amounted to £572,000 in the year 1866, but in 1885 to only £31,300. Opium is grown not only for local consumption but for distribution in parts of northern and central China. The taste for Indian opium is disappearing in favour of the home article, and now that the Che-foo Convention has come into force, and has in fact, though perhaps not in name, imposed an additional duty on the Indian article, it is almost safe to prophesy that in a short time the Indian trade will be seriously affected and the use of the Indian drug will be confined to a few wealthy *gourmets*. Mr. James further remarks that he can only remember meeting two persons who had ruined themselves in health by smoking opium, and that some experienced foreigners whom he met were of opinion that taken in moderation on a full stomach it is no worse than tobacco.

Ginseng.

The collection of ginseng also came under the observation of Mr. James, who states that he saw in the Ch'ang-pai mountains companies of young men, twelve or fifteen in each, scouring the valleys and glens in search of the wild plant. The finding of one or two roots repays them for a season's labour, since that of the wild plant sells for £10 to £20 per ounce. A good deal of cultivated ginseng is grown in Manchuria, but the value of it is comparatively very small, being only 5*s.* or 6*s.* per pound. He thinks that the extraordinary virtues attributed to the plant are not altogether moonshine, having found tea made from the shredded root very useful in cases of stomach-ache. He also mentions the curious fact that the Chinese pay an extraordinary price for recently developed deer horns for use in medicine. If secured a short time after the horn has sprouted, when only about a foot long and full of blood, the Chinese are ready to pay almost any price for it. One such pair was shown to him for which £50 had been refused (*Proc. Roy. Geo. Soc.*, Sept., p. 537).

Mosquito Bites.

According to Dr. Gerard (*Archives*, Sept. 5, p. 406) the inconveniences resulting from bites by mosquitoes and gnats, especially when recent, may be relieved by rubbing the bitten spot with chloroform. The swelling quickly decreases and the pain and itching disappear.

Glucosides and Ferments.

In a recent inaugural dissertation, Herr Grisson has given some interesting information respecting the behaviour of some glucosides towards the physiological ferments (*Chem. Zeit.*, Aug. 14, p. 195). Amygdalin was found not to be decomposed by any of the true digestive ferments, nor by yeast or invertin; neither is it split up by the organs of the body. But it is probably attacked by the putrescent ferment. It would therefore appear that the toxic action of amygdalin depends upon it undergoing putrescent decomposition, probably in the small intestine, with the formation of hydrocyanic acid. Salicin and helicin undergo decomposition in the animal organism, which would appear to be manifested by an increase in the quantity of sulphoacids after a dose of either of them; but they are not split up by saliva, pepsin or yeast, and probably not by the intestinal ferments, though possibly under favourable conditions they may undergo putrid fermentation in the small intestine. But the liver and kidneys of rabbits were found to exercise upon them a decomposing action, similar to fermentation, though no such action could be detected with blood, muscle or lung tissue. Arbutin is not split up by saliva or pepsin, and probably not by the intestinal ferments, though it may be attacked by the putrescent ferment. Like the preceding glucosides it is for the most part absorbed by the stomach unaltered, its subsequent decomposition in the system being recognizable.

Hop Aphis.

In a paper by Professor C. V. Riley read before the British Association at Manchester (*Gard. Chron.*, Sept. 17, p. 334) a fact was made known which should prove valuable to hop growers. He states that the hop aphis (*Phorodon humuli*) spends a part of its cycle of existence on the plum or other species of *Prunus*. The insect produces winged females about the middle of August, which deposit their young on the plum and these produce male winged and female wingless insects, the latter depositing eggs on the bark of the twigs (usually on the previous year's growth). These eggs are not easily seen, being laid singly and covered with particles resembling the bark in colour and appearance. They are also very small, being only 0·04 mm. long. The insects become hatched early in spring, and after three generations become winged, the winged generation migrating to the hop in April. Frost and extreme heat and drought are fatal to the insect. It is recommended by Professor Riley that plum trees should not be grown near hop gardens, and that the wild plum trees in their neighbourhood should be destroyed, so as to prevent propagation of the insect during the winter. The aphis can be destroyed on the hop by syringing with soft soap solution.

Foxglove Monstrosity.

A remarkable monstrosity of foxglove flowers is described in *Nature* (p. 482) by Mr. F. R. Tennant. In five out of the six expanded flowers the calyx consisted of five equal linear segments, but in the other the segments were normal (four broad and one narrow). The corolla in four out of six flowers consisted of two narrow petals with long claws, placed at opposite points on the receptacle. In one flower these were respectively divided into two and three lobes, thus forming a perfect two-lipped flower; the lips, however, were quite separate from one another. In

the only other flower the upper lip was wanting, the three-lobed lower one alone being present, and upon it, alternating with its lobes, were inserted one long and one short stamen, the other flowers being without stamens. The styles also presented an abnormal development. Two of the flowers possessed a single style, forked below the middle; in two others there were two styles, and in another there were three styles; in the sixth the style was normal.

Stipules.

A lengthy research on the nature and origin of stipules is given by Mr. G. Colomb in the *Annales des Sciences Nat.* (pp. 1–64). He considers that various organs, such as the spines of *Xanthium spinosum* and of the orange tree, and the tendrils of sarsaparilla, have been considered on too slight grounds to represent stipules. Having examined the structure of the stipular organs of various plants, he has been led to the conclusion that the name of stipule should be limited to any appendage inserted on the stem of which the vascular system is exclusively formed of branches of the vascular bundles passing into the petiole. He regards the stipule as forming a portion of a ligule. The ligule he defines as consisting of three parts, viz., sheathing, axillary and stipular portions. When the stipular portions exist only, these are to be considered as stipules; when the axillary portion is also present, the term axillary stipule may be used; and when the sheathing portion is also present the name of ligule is applied. The difference in structure of the ligule and stipule is therefore only one of degree.

Relative Chemical Activity of Mineral Acids.

The relative speed with which the mineral acids decompose calcium carbonate has been the subject of an investigation by M. Spring (*Pharm. Zeit.*, Aug. 24, p. 478). He reports that he found the speed of the reaction with all the acids used to be the same when the strength of the acids stood in inverse relation to their molecular weights. In other words, with acids of equal concentration the speed of the reaction was inversely as the molecular weight. The greatest activity, however, was not manifested, as might be expected, at the commencement of the action of the acid upon the carbonate, when the acid was strongest, but was attained only after a certain quantity of carbonic acid had been evolved, furnishing another instance of the important influence of time in chemical reactions. On comparing the action of the acids at the temperatures of 15° C. and 55° C. it was found that the relative speed was about 1 : 2.

Composition of the Atmosphere.

The approximation to uniformity in the relative proportions of oxygen and nitrogen in the atmosphere throughout the world has been contested by more than one author, but some results recently reported by Messrs. Kreusler and Hempel are confirmatory of the statements upon this point by Bunsen and Regnault (*Pharm. Zeit.*, Aug. 24, p. 477). These observers have found that the atmosphere in one and the same place undergoes only relatively small changes in its composition, and that the average proportion of the oxygen in one place is extremely near to that occurring in other places. Thus, in Cleveland (Ohio) it amounted to 20,933 per cent.; in Poppelsdorf (Rhenish Prussia) to 20,922 per cent.; in Dresden to 20,90 per cent.; in Tromsöe (Norway) to 20,92 per cent.; and in Para (Brazil) to 20,89 per cent. The limit of variation in the same place lay within 0·05 per cent. in Cleveland, 0·04 per cent. in Poppelsdorf, 0·08 per cent. in Dresden, 0·1 per cent. in Tromsöe, and 0·13 per cent. in Para.

Maximum Density of Water.

The fact that water under ordinary conditions has its maximum density at a temperature of 4° C. above its freezing point is one that is occasionally brought home to the cognizance of the householder by the bursting of water pipes. M. Amagat has, however, made the interesting observation (*Pharm. Zeit.*, Aug. 24, p. 478) that the maximum density temperature point is lowered by pressure, and the anomaly eventually disappears. He states that under a pressure of 200 atmospheres the maximum density of water occurs at 0° C., and that under a pressure of 3000 atmospheres water conforms in behaviour in this respect to all other liquids.

Pyromagnetic Dynamo.

The problem as to how the energy latent in fuel may be converted directly into electric energy is one that has attracted the attention of many eminent physicists, and if solved satisfactorily would doubtless revolutionize the mechanical methods of the world. But even the best results hitherto obtained have only represented the conversion of a very small fraction of the energy. Recently the problem has been attacked from a fresh direction by Mr. T. A. Edison, who, in a paper read last month before the American Association for the Advancement of Science, described a new "pyromagnetic dynamo," or machine for producing electricity directly from fuel (*Scient. Amer.*, Aug. 27, p. 133). It is constructed so as to utilize the property possessed by the "magnetic" metals of manifesting wide differences in capability of magnetization within comparatively moderate ranges of temperature. For instance, iron, which has a maximum intensity of magnetization represented by the figures 1390 at ordinary temperatures and 1360 at 220° F., loses all power of being magnetized at a cherry-red heat; nickel, with a power of magnetization at ordinary temperatures represented by 800, falls to 380 at 220° F., and loses it all at 400° F. Since, moreover, whenever a magnetic field varies in strength in the vicinity of a conductor a current is generated in that conductor, it occurred to Mr. Edison that by placing an iron core in a magnetic circuit, and by varying the magnetizability of that core by varying its temperature, it would be possible to generate a current in a coil of wire surrounding the core. The ingenious manner in which this property has been utilized in the construction of the pyromagnetic motor can hardly be described in a brief paragraph, but it may be stated that the apparatus consists essentially in a bundle of very thin-walled iron tubes, placed between the poles of a permanent magnet and free to revolve round an axis at right angles to the plane of the magnet. A blast of hot air being made to pass through the tubes on one side of the bundle or drum, the magnetic equilibrium is destroyed, causing the drum to revolve upon its axis like the armature of an ordinary dynamo. The tubes as they pass round from the demagnetizing influence of the hot blast meet a current of cold air, which reduces their temperature sufficiently to bring them again under the influence of the magnet, and so continues the rotation. Results already obtained by Mr. Edison lead him to the conclusion that the economy this pyromagnetic motor will be capable of effecting in the production of electric energy from fuel will

be at least equal to and probably greater than that of any of the methods now in use, although the actual output will be less than that of an ordinary dynamo of the same weight. Indeed Mr. Edison admits that to furnish thirty sixteen-candle lights would probably require a pyromagnetic motor weighing two or three tons. By a variation in the arrangements Mr. Edison has applied the same principles to the construction of a generator.

Hydrogen Amalgam Process.

In the extraction of gold from quartz by the amalgam process, advantage is taken of the property possessed by mercury of absorbing or forming an amalgam with gold coming into actual contact with it. But the process is not equally economical with all varieties of ore. In some refractory ores the gold is variously associated with sulphur, iron oxide, arsenic, antimony or zinc, and the presence of one or more of these leads to the formation of a film of oxide on the surface of the mercury, which becomes "sick," or incapable of seizing the gold, to the extent to which the latter metal is prevented by the film of oxide from coming into contact with the "quick" mercury. In addition this sick mercury powders or "flours," and is carried away with the tailings, leaving a fresh surface to be attacked, so that there is a continual loss of mercury in addition to that of the gold that escapes seizure, which has been estimated to average as much as 40 per cent. of the gold originally contained in the ore. A contrivance for avoiding this loss, by maintaining the "quickness" of the mercury, the invention of Mr. Molloy, is said to have given satisfactory results in the laboratory of Messrs. Johnson, assayers to the Bank of England (*Times*, Sept. 9). The apparatus consists in a shallow pan containing mercury, in the centre of which is fixed a jar containing a cylinder of lead and solution of sulphate of soda. The lead cylinder is connected with the positive pole of a small dynamo and the mercury with the negative pole. Upon a current being passed, electrolysis of the solution of sulphate of soda takes place, and hydrogen is evolved from the surface of the mercury, where a portion of it combines to form a hydrogen amalgam. Oxidation is thus prevented, and the powdered quartz, being made to pass over and in contact with the surface of the "quick" mercury by means of a revolving disk, is said to be completely deprived of its gold.

THE CORK TREE IN THE FORESTS OF TUNIS.*

The forests of Tunis, which cover an appreciable part of the surface of the country, were, until the French occupation, subject to no supervision, and suffered from the many causes resulting from the want of that supervision. In 1883, the French, alive to the importance of preserving what remained of these forests, which are the property of the State, placed them under the management of a separate department, which has carefully explored their extent, and conclusively demonstrated that they are an important element of national wealth.

The explorations of the new department have resulted in the division of the forests into two main groups; one consisting of the cork tree and deciduous oak, locally known as "Zen," covering the north-western angle of Tunis where it abuts on the Algerian frontier and the sea, inhabited by the Kroumirs, and separated from the rest of Tunis by the river Mejerdah. These trees grow in a stratum of sandstone, which again reposes on the upper chalk, and they completely disappear where the latter stratum crops to the surface. They cover an area of about 360,000 acres, on 330,000 acres of which flourishes the cork-tree, and on 30,000 the "zen."

It is to the cork-forests that the attention of the new administration has been mainly directed. They are situated in a country with a very sparse population, dwelling in huts formed of the branches of trees. Their number is estimated at 12,000 souls, or only one individual to thirty acres. It was open to the French administration, which wields the authority of the Bey, to adopt one of the three following systems in dealing with the woods and forests, viz., their sale, their concession for fixed periods, or their management by the State. The last was chosen as the system best adapted for their preservation and extension, particularly as it was held to be of paramount importance to favour the increase of rainfall in the country; the quantity of which is supposed to be intimately connected with the extent of the forests. That they were more extensive in the times of the Romans, and that they conduced to augment the annual rainfall, may be inferred from the discovery of numerous aqueducts among hills which are now absolutely denuded of trees and destitute of springs.

Much has been done during recent years in improving the condition of these cork-forests. Roads have been cut through them, and at stated intervals spacious alleys have been frayed to serve as a means for arresting the march of the destructive fires which frequently ravage them. Above all, much progress has been made in barking the cork-trees, an operation which consists in stripping the rough bark of the trunks of the trees, to the height of five or six feet from the ground. This virgin bark is without value, and only for ten years after the trees have been robbed of it, is the inner bark available for commercial purposes, the trees giving a crop of cork every ten years. To meet the expenses incurred in these operations, there were available the sums accruing from the sale of the trees already felled, and of the bark of the "zen" for tanning. The director of woods and forests has drawn up an estimate of the receipts and expenses of his department for three consecutive decennial periods, according to which in twenty years, or at the commencement of the third decennial period, the anticipated expenditure per annum is £27,000, while the expected receipts are £96,000—leaving a profit of £69,000.

The above calculation regards the cork-forests only which grow on the sandstone to the north of the Mejerdah river, in the region lying between the Algerian frontier and Bizerta. Little has been done towards working the less valuable forests to the south of that river. An experiment has been made in planting with trees a small tract of mountain land near Hammam-el-Enf, some ten miles to the east of the town of Tunis. The operation consists in digging holes at short distances, and in dropping in each a few seeds of the pine tree. Several hundred acres have thus been planted with tolerable success, at an expense of £4 10*s.* an acre.

The worst enemies of the forests are goats. Some French colonists have taken steps to exclude these animals from their estates, and the result has been that shrubs which never attained the height of more than two or three feet, have in four or five years assumed the dimensions of trees. This is particularly apparent in the large domain of Enfida, near Susa, belonging to the Franco-African Company, where the thuja, which covers much of that domain—from a dwarf shrub, has now, within the space of six years, attained a height of twenty to twenty-five feet.

* From a report by Mr. Consul Sandwith.

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AMERICAN PHARMACEUTICAL ASSOCIATION.

ALMOST simultaneously with the meeting of the British Pharmaceutical Conference in Manchester, the American Pharmaceutical Association held its annual session at Cincinnati, and we have just received copies of the papers read on that occasion, for which we are indebted to the kindness of Professor P. W. BEDFORD, the Editor of the American *Pharmaceutical Record.* The only one of those papers which is of a scientific character is on "The Oils of Pennyroyal and Citronella," by Mr. E. KREMERS, in which he gives an account of the results obtained in a chemical examination of these oils as supplied for the purpose by Messrs. FRITZSCHE, the large distillers of essential oils. The pennyroyal oil examined was that official in the American Pharmacopœia, the produce of *Hedeoma pulegioides*, a low odorous annual indigenous to North America, and growing in some parts so extensively that it can be collected by the ton without much trouble. The distillation of this plant for obtaining the volatile oil is chiefly carried on by the local farmers in stills of very rude construction, as described in the previous volume of this Journal.* In MAISCH's 'National Dispensatory' it is stated that the oil of hedeoma contains oxygen, and that its exact composition has not been ascertained; but beyond this there is little information as to the chemistry of this oil. Mr. KREMERS has ascertained that it contains (1), a low boiling alcohol, the nature of which has still to be determined; (2), a body having the composition $C_{10}H_{18}O$, for which he suggests the name hedeomol; (3), formic and acetic acids, and (4), an oily acid having the composition $C_7H_{13}O_2$, which he names isoheptoic acid. It is considered that these acids probably exist in the original oil in the form of ethereal salts. The other oil examined was the produce of *Andropogon nardus*, obtained extensively in the southern provinces of Ceylon. Very little was known of the chemistry of this oil, most of the statements published concerning citronella oil having reference to the produce of *Andropogon schœnanthus.* The oil examined by Mr. KREMERS was of a pale yellow colour, assuming a greenish tint when exposed to light; its specific gravity was found to be 0·8833; it was miscible with alcohol in all proportions, and gave no reaction with ferric chloride; when shaken with an equal volume of concentrated solution of sodium bisulphite a mass of crystals was formed showing the presence of an aldehyde or possibly of a ketone. The greenish colour of the oil appears to be due to the presence of copper in combination with an acid constituent of the oil. Mr. KREMERS' experiments lead him to conclude that this oil consists of (1), a heptoic aldehyde, $C_7H_{14}O$; (2), a terpene, $C_{10}H_{16}$; (3), a body isomeric with borneol, $C_{10}H_{18}O$, which he has named citronellol; (4), acetic and valerianic acids, both of which are probably formed by the oxidation of the aldehyde and exist in the oil as ethereal compounds with the citronellol.

Among the other papers read at the meeting of the American Pharmaceutical Association, one by Mr. A. B. TAYLOR on weights and measures consisted of a general review of the different systems in use in Great Britain, America, and other countries, serving to illustrate the difficulties attending any change of system and the desirability of avoiding ill-advised or hasty action for that purpose until such time as a reasonable prospect of arriving at satisfactory results can be secured by the consultation and agreement of an international convention assembled for the purpose of establishing permanent and universal uniformity of weights and measures.

A paper on the washed nitrous ether of the American Pharmacopœia was read by Mr. W. S. SIMONSON, of Cincinnati. The amount of ethyl nitrite was determined in forty samples, and found to vary very considerably (from 37·1 to 61·1 per cent.). These variations were found in samples representing an entire year's production in one factory, and that of one month in another factory, and they are considered to be illustrative of the character of samples from other sources. If, therefore, the proportion of ethyl nitrite be the chief indication of medicinal value in the spirit of nitrous ether, the possibility of such variation is a subject that requires consideration with a view to the modification of the process of manufacture. The method of analysis adopted was that introduced by ALLEN, measurement of the nitrous oxide evolved from a mixture of a known quantity of the ether to be tested with a strong solution of potassium iodide and a dilute acid. It may be mentioned that the process by which the United States Pharmacopœia directs spirit of nitrous ether to be made approximates to that suggested some years ago by Mr. JOHN WILLIAMS.* Instead of diluting pure ethyl nitrite with alcohol, the washed ethereal liquid obtained by distilling a mixture of spirit with nitric and sulphuric acid is diluted with nineteen times its weight of alcohol, and the assumption is that the ethereal liquid would contain eighty per cent. of pure ethyl nitrite. Experience has shown that there is often a great difference between the product

* *Pharm. Journ.*, vol. xvii., p. 672.

* *Pharm. Journ.*, vol. viii., p. 441.

made by the Pharmacopœia process and that which is required, giving rise to much trouble between manufacturers and consumers, and the results obtained by Mr. SIMONSON show that there is need for an alteration of the official process.

In the course of an inquiry into the making of emulsions, Mr. E. PAINTER has found the mucilage of Irish moss to be a satisfactory emulsifier of fixed oils, and he gave an account of his experiments on this subject at the meeting. For the purpose of preserving the mucilage for use as an emulsifying agent attempts were made to use alcohol, but it was found that the emulsifying power of the mucilage was thus so very materially reduced, that it was not fit for the purpose. Drying the mucilage in thin layers was then tried, and the yield of gelatine in this way was about seventy per cent. In making emulsions with the mucilage sixty grains of moss was used to make five ounces of mucilage, that quantity being required to make one pint of a fifty per cent. emulsion of oil. Consequently forty grains of the Irish moss gelatine would represent the quantity to make a pint of emulsion. The gelatine dissolves readily in hot water, yielding in a short time a suitable mucilage, and on shaking it with the oil to be emulsified a satisfactory result is obtainable. A second paper by Mr. PAINTER dealt with the burning question of proprietary pharmaceutical preparations. The author gave the result of his review of prescriptions of leading medical men for a period of more than twenty years, as showing that in proportion as scientific research has isolated the different principles of the drugs employed in medicine the use of their separate principles has become more general, while that of the galenical preparations has decreased, and he anticipates that there will be a development in this direction of such a nature that eventually all remedial agents will be presented in their simplest forms. In this evolution the pharmacist must advance with the prescriber, by providing means to enable the prescriber to make his selection of medicines for administration, and not resting content to hand out or count out factory-made preparations, or to sell other cure-all nostrums. But while this work is proceeding the benefits accruing from it are lessened, and the work itself retarded, because medicine and pharmacy are being demoralized and saddled with a stupendous burden by the manipulators of remedies who force their mixtures into notice as primary medicinal agents. According to Mr. PAINTER there are in the United States no less than one hundred and sixty different "manufacturers of pharmaceutical preparations" who in reality are for the most part mere manipulators and mixers of drugs, sending out "drummers" to the medical men to distribute samples, to extol their wares, and to urge the physician to designate their particular "make" in prescribing. One fourth of these manufacturers, in New York, include in their lists not less than 36,500 mixtures, each designated by some particular name and so prescribed. Such preparations, it was contended, are totally unworthy of the distinction of being prescribed by medical men; their promoters have originated nothing except the scheme of appropriating the work of others, perverting its application, and by a system of advertising saddling upon medicine and pharmacy a burden that is becoming intolerable.

One of the most important features of this meeting of the American Association is the alteration which has now been finally made in its constitution. Hitherto it has been restricted to dealing with the scientific aspect of pharmaceutical affairs; but under the arrangement that has been agreed upon, subjects of commercial interest, education and pharmaceutical politics will be included in its deliberations. This change has been rendered necessary to a great extent by reason of the large number of State associations existing in the country, the effect of which has been to dry up the sources from which contributions of papers on pharmaceutical subjects could be obtained by the national association. Hence the resolve to widen the sphere of its work, and thus it is hoped to maintain its supremacy and its reputation for representing all of the pharmaceutical interests of the country.

On Wednesday next the first evening meeting of the Pharmaceutical Society for the present session will be held, and as usual the first business will be to receive the reports of the Professors and to distribute the prizes obtained by the students at the examinations which took place last July. In addition an address will be delivered as the inauguration of the session about to commence, and, as already stated, it will on this occasion be given by Sir Dyce Duckworth. The chair will be taken by the President at half-past eight, and all students are invited to be present, as well as their friends, both ladies and gentlemen.

* * *

At the evening meeting of the Society next Wednesday a special feature of interest will be the presentation of the Hanbury Gold Medal, which has been awarded to Brigade-Surgeon Dymock, of Bombay. Our readers will be familiar with the contributions of Mr. Dymock to this Journal for many years past, and from them may form some estimate of the services he has rendered in elucidating the natural history of drugs and other products of India, and of the fitness of the award that is intended as a recognition of them.

* * *

The School of Pharmacy classes will recommence work next week, the Chemistry lectures by Professor Dunstan on Monday morning at nine o'clock, and the Botany lectures by Professor Green on Friday morning at the same hour. The Practical Chemistry students will also commence work in the laboratory on Monday at ten o'clock. The demonstrations in Materia Medica by Mr. Holmes will be commenced on Thursday morning at ten o'clock, and the lectures and demonstrations in Pharmacy by Mr. Ince on Tuesday evening at five o'clock.

* * *

The Inaugural meeting of the Sheffield School of Pharmacy will be held on Wednesday, the 12th inst., at 7 p.m., in the Cutlers' Hall, Sheffield. An address will be delivered by the President, Mr. J. M. Furness, and the prizes and certificates will be presented by the President of the Pharmaceutical Society. At the close of the meeting the Annual Dinner of the Sheffield Pharmaceutical and Chemical Society will be given in the same building.

British Pharmaceutical Conference.

GENERAL MEETING AT MANCHESTER.

READING OF PAPERS.

Wednesday, August 31.

(*Concluded from page* 276.)

The next communication was a—

NOTE ON THE PHARMACY OF LOGWOOD.

BY LOUIS SIEBOLD.

The object of this paper is to deal with the following questions:—

1. Which is the kind of logwood best suited for use as a medicinal agent?

2. What is the nature and condition in which this wood should be employed for pharmaceutical purposes?

In reference to the first question, I am decidedly of opinion that the woods of Campeachy or Honduras ought to be used in preference to those of San Domingo or Jamaica, on account of their greater richness in hæmatoxylin, the astringent principle of logwood. I have no doubt that you will all agree with me on this point, and will therefore at once proceed to the discussion of the much more important subject embodied in the second question. As regards the nature and condition in which this wood ought to be employed by pharmacists, the Pharmacopœia affords no satisfactory information, and appears to ignore the fact that logwood of all kinds is met with in commerce in two essentially different states. The ground wood or chips met with in shops and sold by wholesale houses is not, as many of you may suppose, the unaltered wood obtained from the logs as imported; but it has been subjected to a long process of fermentation, involving considerable changes in its chemical composition. In order to bring about this fermentation the ground wood obtained from the logs, either in the form of chips or a coarse powder, is thoroughly impregnated with water and laid up in large heaps exposed to the air for weeks. A rise of temperature takes place after a few days, which is checked or moderated by frequently turning over the heaps of wood, and thus exposing fresh surfaces to the action of the atmosphere. The process is completed in four to six weeks, according to the season of the year and the quantity operated upon. During this fermentation the pale colour of the original wood changes to a deep red, owing to the conversion of the hæmatoxylin into its oxidation-product, hæmatein; and some of the chips assume a greenish cantharides-like hue on the surface. The wood is then in the best condition for technical purposes; but the question arises whether it is equally suitable in this condition for use in medicine and pharmacy. The great difference between the unfermented and the fermented wood is well known to those engaged in dyeing and calico-printing, and to technical chemists acquainted with these industries; but it seems to have hitherto escaped the attention of pharmacists and the medical profession. The Pharmacopœia leaves it quite doubtful which of the two woods should be used for the preparation of the officinal extract and decoction, for the description given of the colour of the wood corresponds with that of the fermented article, while the sweetish taste referred to in that work is a characteristic feature of the unfermented wood, and is entirely absent from the other. Both have an astringent taste, but it is only in the unoxidized wood that this astringency is associated with a pleasant sweetish flavour, which to some extent masks its stronger astringency. The preparation of the decoction and extract from the unchanged wood presents no difficulties and furnishes satisfactory products possessing the characteristic sweetish astringency of the raw material, and exercising a marked beneficial effect when used as a gargle in cases of sore throat, or when administered internally for giving tone to mucous membranes in general. The decoction and extract obtained from fermented wood, so far as my experience goes, appear to be less efficacious, and are certainly much less palatable. They, have, moreover, the defect of undergoing further and progressive chemical changes during their preparation, owing to the formation of resinous and insoluble oxidation products from the hæmatein at elevated temperatures. The extract, particularly, suffers much in this way during its evaporation in open vessels, and is for this reason much less perfectly soluble in water than the extract prepared from unaltered wood. Solid logwood extract is not manufactured on a very large scale in this country, liquid extracts being generally preferred by dyers and printers. I recommend pharmacists and wholesale drug houses to prepare the solid extract themselves, since that imported from abroad for technical purposes is generally not pure enough for medicinal use, and is not unfrequently much adulterated. The question as to the condition in which the wood should be used by pharmacists, either for the extract or the decoction, I am strongly inclined to answer in favour of the unchanged wood for the reasons already given; and I shall be very glad to hear the opinion of the meeting on this point. The subject is not an unimportant one, and I very much fear that fermented logwood has hitherto been almost exclusively employed in pharmacy, since the unchanged wood is rarely met with in commerce in the ground state or in chips.

In conclusion, I wish to recommend a clear fluid extract of 1·06 specific gravity, made from natural logwood of good quality, as an elegant, efficient and very permanent preparation. Such an extract may be readily obtained by extracting the ground wood, in the form of a coarse powder, repeatedly with boiling water acidulated with a few drops of hydrochloric acid, evaporating the united and strained infusions at a moderate temperature until the residual extract is equal in weight to the wood employed, then allowing to settle for a week, and drawing off the clear extract from the sediment. The product has a fine red colour, is very palatable, and possesses in a high degree the medicinal properties of the wood. It can be kept for years without undergoing fermentation or any appreciable change.

Mr. MABEN said they were much indebted to Mr. Siebold for this paper, and he thought there could be no doubt with regard to the first question, that pharmacists ought to use the best logwood obtainable, but the second question was a little more complicated, and differences of opinion might prevail. In the first place he would inquire, What did logwood owe its medicinal qualities to? Was it the colouring matter of tannin? It was usually prescribed as an astringent medicine. The tannin was probably more effective than the colouring matter, and it was a question whether the tannin was effected by the fermentation. If so there was another element to be considered. This fermentation process was evidently adopted so as to age the logwood, so that the colouring matter might be developed. If they bought the wood unfermented they got it of a much lighter colour, but if it were kept for a year or two they would probably find it had got quite red. The difficulty would be to have a preparation which would always be identical in colouring. But this was not such a great difficulty after all, because the preparation Mr. Siebold had shown, which he made from unfermented logwood, was also a deep red. He presumed it was impossible to get the hæmatoxylin even from unfermented logwood, except in the red condition. He was in hopes that Mr. Siebold would give a process for ascertaining the percentage of hæmatoxylin and hæmatein in the logwood of commerce, and also in logwood extract. It was a difficult process, and the methods proposed were so extremely unsatisfactory that he should have been delighted if Mr. Siebold could have given one that could be relied upon. They had frequently to examine samples for the percentage of colouring matter. Mr. De-

chan, who did the work in his laboratory, tried to get a reliable process. He had tried with lead salts, silver, copper, mercury, iron, chromium and others, but it was extremely difficult to get constant results. Chromium, perhaps, seemed most likely to succeed, but it failed to carry down all the colouring matter. On the whole, if the fermentation did not destroy the active medicinal property in the logwood he was not sure that it would be quite advisable to change the established practice.

Mr. CONROY said there were one or two points he should like to have a little further information upon. In the first place Mr. Siebold did not quite explain whether there was any loss of tannin in the fermented wood. It occurred to him, seeing that logwood chips were used for dyeing purposes, that the cutters of wood found by experience that by exposing the wood the colouring matter and astringent properties became more developed. New wood, Mr. Siebold said, was much more efficacious than the old, from which he gathered that it contained more tannin, because it was to the tannin its properties were chiefly due. Mr. Siebold was so conversant with the subject that no doubt he would throw further light upon this point.

Mr. HOLMES asked whether the extract Mr. Siebold had prepared had been subjected to therapeutic experiment, and found to be as valuable as that prepared in the ordinary way. Having tasted it he found it to be perfectly astringent. He was much indebted to Mr. Siebold for clearing up some points which had hitherto puzzled him. He had tried to obtain in commerce the different kinds of logwood mentioned in the text-books, and had noticed the different colours of the specimens he had obtained. In fact, a gentleman who used logwood for dyeing animal tissues in microscopic sections pointed out to him that some logwoods gave a blueish dye, whilst others a purplish, and asked him the reason, which at the time he could not explain; but he now supposed the bluer colour was due to absorption of ammonia during exposure to the atmosphere.

Mr. MARTINDALE said he was much obliged to Mr. Siebold for clearing up many doubts in his mind as to what the difference in colour was due to. He had seen logwood in commerce when freshly cut, and did not know that the process of fermentation was followed to prepare it for dyeing, but medical men would prefer it in a state of nature, as undoubtedly its properties were due to hæmatoxylin as well as to tannic acid. There was a great difference in the logwood extracts met with in the market. Some of the common extracts were scarcely soluble and hardly yielded any colour when rubbed with water, whereas others would give a bright purplish colour, and be in great part soluble. Should the extract have that paler colour which the fluid extract, which had been shown, seemed to indicate it ought to have? He found a great difference in the colour also of the hæmatoxylin met with in commerce, some samples were of dark reddish colour, but he preferred it of a pale yellow colour rather than that which he supposed to be oxidized and changed to a dark brownish-red.

Mr. BALKWILL said the real point was the medicinal use of this article, and if the pure wood as presented so interestingly that afternoon had very seldom reached the trade it had still more seldom reached the profession, and he apprehended that the whole of the medicinal credit which logwood had in use depended upon it in its ordinary commercial form. Therefore one inquiry might well be, Which was the kind which medical men wished to have used? It was very possible that the wood in its natural condition would make a better preparation than after fermentation, but that was a matter which had yet to be proved. Mr. Siebold spoke of logwood having lost its sweet taste in the process of fermentation, but if that were so he was at a loss to know how those who had lived in the country and had never seen this new wood before should have no idea of any other wood but that which had a sweet taste. He was exceedingly glad of the suggestion of a liquid extract, for although the hard extract was in frequent use he had never had any experience of its being dispensed, except when dissolved, and this process was always a little troublesome; it would be a great improvement, therefore, to have a fluid extract brought into use, but there should be experiments made as to its medicinal value of the unfermented wood.

Mr. ROBINSON said undoubtedly the logwood they were used to was astringent, but he did not clearly catch from Mr. Siebold whether he said it would be impossible to prepare such an elegant preparation as he had sent round with the ordinary fermented wood. Of course if it changed colour so rapidly there would be great difficulty in dealing with it.

Mr. MACEWAN said he had always understood that the darkening of logwood was partly due to exposure to atmosphere containing a little ammonia. Some might recollect that in making the decoction if distilled water was used a much paler preparation was obtained than with ordinary tap water. That again seemed to indicate that alkali had the effect of darkening the colour. The change by fermentation was well known, but they should not overlook the fact that darkening was also due to the action of ammonia.

Mr. SIEBOLD, in replying, said it seemed to be assumed by some of the speakers that tannin was the astringent principle of logwood; but this he was not prepared to admit. No doubt, tannin did occur in small and variable proportions in this wood, but not in such quantities as to be of any importance. Indeed, most of the text-books left tannin entirely unmentioned among its constituents. The astringency of logwood, combined, as it was, with an agreeable sweetness, was mainly due to hæmatoxylin, and this, he thought, must also be regarded as its active medicinal principle. One of the speakers asked how the fresh wood was to be kept if it was so prone to change, and said that after a while it might become red in appearance and liable to further changes. But there really was no difficulty about this. If they would reduce the logs to a coarse powder—he should prefer that to chips—it could be kept in a dry place for almost any length of time without any material deterioration. There would be a slight and gradual change in colour, but this was merely superficial; and if the wood were kept for years, carefully stored, it would still have a sweetish taste and be perfectly fit for use. Therefore they were perfectly safe with such a wood. They need not be afraid of a great change such as the fermentation he had described, which was not due to mere exposure to air but required the presence of a large proportion of water. It was this soaking wet wood which, when exposed to the atmosphere suffered the great change alluded to, and finally yielded a product containing no longer hæmatoxylin but hæmatein; and the wood so changed would be entirely devoid of astringency but for the small quantity of gallic acid. This change was brought about by a ferment contained in the wood, which acted in the presence of water at ordinary slightly elevated temperatures, but, like all other ferments, was destroyed by the heat of boiling water. The conversion of hæmatoxylin into hæmatein could also be effected by mere atmospheric oxidation, without the intervention of the ferment, but then it required the presence of a large proportion of alkali. For this purpose a strong decoction of the unchanged logwood, or a solution of the extract, should be treated with an excess of caustic alkali and then exposed to the air for several days; or a current of air should be passed through the powerfully alkaline liquid for several hours. Under these conditions oxygen was rapidly absorbed and hæmatein formed, which could then be separated by precipitation with acetic acid, provided the oxidation had not been allowed to go too far so as to lead to the destruction of the hæmatein and the formation of resinous bodies. But as already stated, this mode of atmospheric oxidation required the presence of a large proportion of alkali; and the traces of ammonia

in the air, to which some of the speakers had alluded, could only effect but a very slight change. The statements contained in some books that these traces of ammonia in the air were the cause of the change occurring in the ageing of logwood must, he thought, be dismissed as erroneous. This change must be regarded as a true fermentation, the elevation of temperature accompanying it, and the fact that boiled preparations of fresh logwood, such as the liquid extracts he had recommended, were not liable to this change went to prove that assertion. Mr. Holmes had inquired whether he, Mr. Siebold, had submitted his liquid extract to medical practitioners for trial. This he had not done so far, and his statements relative to its efficacy were based on his own observations only. He would be glad, however, to submit samples of the preparation to anyone willing to give it a trial. As to the general question whether medical men were likely to prefer the natural or the fermented wood, he thought they were not likely to know much of the different natures of these woods at present, since even most chemists were but little acquainted with them, and it was only after they had been made acquainted with the chemistry of the subject and after actual trials based on such information that they could pronounce an authoritative opinion. He had also been asked why he was so sure of the superiority of the unfermented over the fermented wood for medicinal purposes. Well, he had explained to them in his paper the decidedly greater suitability of the unfermented wood for pharmaceutical preparations, and it could hardly be supposed that unstable preparations, more or less liable to never-ending changes, could be better suited medicinally. If they were, the onus of proof rested with those, if any, who advocated the use of the fermented wood, claiming it to be superior as a therapeutic agent. In the absence of any such proof, he contended that it was the proper course to give preference to the natural drug rather than to one altered by fermentative changes. Referring once more to the liquid extract he had recommended, he wished to point out the further advantage consisting in the avoidance of some chemical changes, resulting in the formation of resinous matter, which were always more or less liable to occur at the higher temperature required towards the end in preparing the solid extract, changes which invariably rendered the extract less perfectly soluble.

The same author then presented a—

Note on the Application of Dyewoods in Chemical Analysis.

BY LOUIS SIEBOLD.

Previous reports on this subject have failed to state what kind of logwood is best adapted for analytical purposes. I therefore wish to point out the great superiority of the aged or fermented over the unfermented wood, and to call your attention to its extraordinary delicacy as a test for metals. A litre of water containing 1 milligram (or 1 part per million) of such salts as copper sulphate, alum, and stannous chloride, gives striking colour reactions with a few drops of a fresh tincture of this fermented wood, reactions so distinct as to be visible throughout this large room, though the actual amount of metal present is only 1 part of copper in 4,000,000, and 1 part of aluminium in 17,000,000. With due care and sufficient practice much smaller proportions may be thus detected. With lead or iron the reactions, though very delicate too, are less so than with copper, aluminium, or tin. The detection of alum in flour and bread is also much easier, and the reaction much more delicate with the aged than with the unaged wood. As an excellent confirmatory test for alum, the reaction with fustic (yellow wood) in the presence of hydrochloric acid, described by Goppelsroeder in the *Zeitschrift für analytische Chemie*, vii., 208, deserves more attention from analysts in general than it has hitherto received.

The paper was illustrated by experiments showing the delicacy of the above tests and the best manner of executing them.

The President proposed a vote of thanks to Mr. Siebold for both these papers, and he only regretted there was not time to discuss the latter. He would now ask Dr. Thresh to read two remaining papers, or give such extracts from them as he thought necessary.

Dr. Thresh then read extracts from the following papers:—

Examination of Commercial Cocoa Butter.

BY EDGAR J. MILLARD.

When the examination of cocoa butter was undertaken, a preliminary review was made of the tests available for the detection of adulteration.

Although official under the name of oil of theobroma in the British Pharmacopœia, the tests therein are most meagre, being limited to a description of its physical properties, stress being laid, however, upon the melting point, which is stated to occur "usually between 30° and 35° C."

It was therefore necessary to see to what extent this could be used as a test, or rather what adulteration was possible, and yet leave the sample with an approximate melting point.

With this view a specimen of cocoa butter, which had previously been found to be pure, was incorporated with different percentages of hard paraffin, wax, beef marrow and tallow. The melting point of the original sample was 33° C., and the addition of as much as 10 per cent. of paraffin, wax or tallow was found to vary the melting point only slightly outside the limits given as "usual" in the Pharmacopœia.

Similarly, the specific gravity was found to be an unreliable test owing, as Ramsperger has pointed out,* to the variations which pure samples give. This variation, which in some cases is very wide, Ramsperger attributed to the different methods used in extracting the oil, and he gives, as illustrations, the specific gravity of a sample he obtained by expression as 0·85, by extraction with ether 0·97, and extraction by carbon disulphide 0·958.

Considering that nearly all the commercial cocoa butter is obtained by the first of these processes, this explanation was not considered sufficiently satisfactory, and it occurred to me as more probable that the high specific gravities were due to oxidation on exposure, somewhat in the same manner as palm oil undergoes by keeping, a change resulting in its becoming harder and rancid, whilst its melting point is raised.

Although I have not been able to absolutely prove this beyond doubt, yet a sample examined two months ago, and which then had a specific gravity of 0·9199, after being purposely exposed, unwrapped, to the ordinary variations of temperature in a laboratory, was found to be 0·9233. It had then lost much of its agreeable odour and chocolate taste.

The U.S.P., however, gives the following specific test for the purity of cocoa butter:—"If two parts of oil of theobroma be dissolved in four parts of ether, in a test-tube, by immersing the tube in water of 17° C., and if this be afterwards plunged into water of 0° C., the mixture should not become turbid, nor separate a granular deposit in less than three minutes; and if the mixture, after congealing, be exposed to a temperature of 15° C., it should gradually become entirely clear."

This test is Björkland's modification of Fehling's, who published his in the *Handwörterbuch der Chemie* bearing his name. It was found to give distinct indications of

* "Adulteration of Ol. Theobromæ," *Pharm. Journ.*, March 24, 1877.

the addition of as little as 5 per cent. of either paraffin, wax, stearin or tallow.

By this method, therefore, all the samples were examined, whilst the specific gravity and melting point were also ascertained as of some interest.

The following eight samples were procured from some of the principal wholesale drug houses in London and Liverpool.

No.	Specific gravity.	Melting point.	Ether test, U.S.P.
I.	0·9648	33° C.	clear.
II.	0·9281	34° C.	clear.
III.	0·9137	33° C.	clear.
IV.	0·8961	32° C.	clear.
V.	0·9174	34° C.	clear.
VI.	0·9058	32° C.	clear.
VII.	0·9009	33° C.	clear.
VIII.	0·8748	30·5° C.	clear.

It will be seen by the above table that all the samples gave clear solutions in ether, even at 0° C.

To ensure a fairly full and complete examination of cocoa butter as met with in pharmacy, the following ten samples were obtained from retail chemists in different parts of London and the country.

No.	Specific gravity.	Melting point.	Ether test, U.S.P.
I.	0·9499	32·5° C.	clear.
II.	0·9362	34° C.	clear.
III.	0·9586	31° C.	clear.
IV.	0·9798	34° C.	turbid.
V.	0·9199	32° C.	clear.
VI.	0·8974	33° C.	clear.
VII.	0·9245	31° C.	clear.
VIII.	0·9752	34° C.	turbid.
IX.	0·9412	33° C.	clear.
X.	0·9655	32·5° C.	clear.

It will be noticed that in the above table two samples gave turbid ethereal solutions. From experiments with the test previously conducted, I feel convinced that the turbidity, which was noticeable on first dissolving at 17° C., was not due to adulteration; but in each case, I am disposed to think, was caused by the slight rancidity or oxidation of the samples, which were also pale coloured or partially bleached from exposure. As, if adulterated, even to so small an extent as 5 per cent., a considerable deposit would have been formed at 0° C.

The results of the examination must be considered satisfactory, as out of eighteen samples tested only two come under even the shadow of suspicion. This result is perhaps not surprising, for cocoa butter is one of the few medicinal substances of which the price has varied but very minutely during the last ten years.

Moreover the demand for it is not of such a nature as to induce sophistication, and the source is, as far as I have been able to ascertain, wholly from the large and reputable chocolate or cocoa manufacturers.

Quinological Work in the Madras Cinchona Plantations.

BY DAVID HOOPER, F.C.S.,
Government Quinologist.

The results of the work shown in the present paper, as in two papers previously submitted to the Pharmaceutical Conference, are taken from the annual report on the Government Cinchona Plantations of the Nilgiris. The experiments are supplementary to those already published, but when taken together are far from complete, for while disposing of some problems in quinology others are opened up, and the more one works in this direction the wider the field of research appears to become.

The report includes the testing of a number of Crown barks in order to show the variation in alkaloidal strength of individual trees growing together under the same conditions, the effects of the stripping process in different months of the year, and the value of bark obtained from trees when treated with different manures. The amount of lime in a full grown tree is given. Further attention is paid to the renewal of Ledger barks, and analyses of some of the rarer species of cinchona are tabulated.

The trees of *Cinchona Officinalis* growing on plot "XI.," Dodabetta, have been subjected to several experiments in order to solve some questions connected with the cultivation of this species. The plot is five acres in extent, it has a northerly aspect and possesses a deep, black soil. The whole plot was coppiced in the autumn of 1879, the trees were therefore in April, 1886, six and a half years old; they were fairly uniform in height, but not so in thickness. Twelve trees were taken indiscriminately from different parts of the central portion of the plot, and strips of the bark taken as samples for examination. The result of their analysis will demonstrate (1) the similarity or otherwise of trees grown in the same plot under apparently similar conditions of altitude, aspect and soil, and (2) the effect of one or two or three stems coming from the same coppiced tree. The following is a description of the twelve trees :—

1. Tree with thick single stem.
2. Two stems of equal size, sample made up of strips from both.
3. Two stems, sample taken from larger one.
4. Two stems, sample taken from larger one.
5. Two stems with "crispy" bark, sample from both.
6. Three stems, sample from largest.
7. One stem with two suckers.
8. Two stems, several suckers, sample from larger stem.
9. Two large stems, sample from one.
10. Two large stems, sample from both.
11. One large stem, two tall suckers.
12. Two stems of equal size with suckers, sample from one.

The following is their analysis :—

	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous alkaloids.	Total.
1	3·90	1·73	·09	·37	·32	6·41
2	3·74	1·82	·16	·34	·32	6·38
3	2·89	1·22	·05	·41	·23	4·80
4	1·75	·85	—	·29	·26	3·15
5	2·77	1·34	·10	·28	·57	5·06
6	3·25	1·44	·12	·24	·70	5·75
7	2·47	1·20	—	·42	·38	4·47
8	3·12	1·39	tr.	·62	·45	5·58
9	2·51	1·27	·06	·36	·26	4·46
10	3·32	1·76	·03	·52	·35	5·98
11	2·75	1·34	·10	·10	·30	4·59
12	2·51	1·21	·09	·50	·29	4·60
Average	2·91	1·38	·07	·37	·37	5·10

A glance at the above table will show how trees of the same age, and growing in the same situation, vary in alkaloidal strength. The quinine, with a corresponding amount of totals, ranges from 3·90 per cent. in No. 1 to 1·75 per cent. in No. 4; and the quinidine from 0·16 per cent. to an entire absence in two cases. It seems quite probable that there is no advantage in raising one stem only from a coppiced tree, as two or three stems have equally rich bark. Compare, for instance, Nos. 7 and 11 with Nos. 2 and 10. No 6 specimen is a rich bark, although representative of three stems; a much larger quantity of bark would be harvested from such a tree than from one with a single stem. But it must be borne in mind that these three stems occupied more than their proper share of space, and, therefore, it would be erroneous to suppose that any great advantage would be gained by growing three stems from one stool, except where the neighbouring trees are inferior in vigour of growth. When of two stems the sample is taken from the larger, it shows no better yield of alkaloids than if it were taken from both. From these results it is worthy of

notice that very little dependence can be placed upon the appearance of a tree as indicating its market value.

The above twelve trees were operated upon on April 10, they were afterwards labelled and covered in the usual way. On the 10th of each month during the ensuing year the plot was visited and a sample taken from the remaining bark of one of the trees, No. 1 in May, No. 2 in June, and so on. The results of such an investigation would prove how the stripping of trees affected the bark left upon them, and would show in which month the yield of alkaloid is greatest.

	Quinine	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous alkaloids.	Total
1. May . . .	3·38	1·56	·08	·23	·34	5·59
2. June . .	2·91	1·18	·14	·32	·56	5·11
3. July . . .	2·33	1·37	—	·46	·53	4·69
4. August . .	1·54	·55	—	·11	·79	2·99
5. September .	2·33	1·13	—	·11	·44	4·01
6. October .	2·78	1·32	—	·11	·52	4·73
7. November .	2·63	1·21	—	·19	·38	4·48
8. December .	3·39	1·43	—	·43	·60	5·85
9. January .	2·58	1·30	—	·48	·54	4·90
10. February .	3·35	1·63	·05	·56	·31	5·96
11. March . .	3·95	2·01	·07	·33	·62	6·98
12. April . .	2·65	1·23	·09	·38	·45	4·80
Average . . .	2·82	1·33	·03	·31	·50	5·08

The facts adduced from this table might be summed up as follows. For six months after the first bark was taken from the trees there was a decrease in alkaloids in the bark left, and in the remaining six months there was an increase. It would appear that the tree had sustained a shock for some time after the removal of the strips, and the original bark had been weakened by the process of renewing going on in its vicinity, as on the seventh month, November, the renewal had well set in over the stripped portions of the tree, and the old bark had begun to recover itself. In November, December, January and February the addition of alkaloids was not great, but in March this was very noticeable, and this corroborates Broughton's experiments in showing March to be the month when the yield of alkaloids is greatest. When the cycle of the year was completed in April, 1887, the bark on the twelfth tree was better than twelve months ago, but only slightly; however, the decrease of quinine and totals in the first six months is counterbalanced by the increase in the last six months, so that by taking the average of these figures for the year it will be seen that there is a close correspondence between them in this and the previous table.

Experiments with Manures.—Plot "XI.," Dodabetta, was in April of last year divided, as near as possible, into five equal portions. Four portions were respectively treated with cattle, stable, lime and stable, and bone manures; the fifth portion in the centre was left in its natural state. In April of this year the entire plot was harvested by means of the stripping process, and the green bark from each portion was collected and dried separately, and its weight ascertained. The trees in each portion were counted, so that the average amount of bark from a number of trees could be calculated and compared with the weight of others differently manured.

The result of the harvest proved that the amount of bark per tree was highest in the portion containing cattle manure, and the next that from prepared bones, but the quantities of bark from the stable and lime and stable manured portions did not materially exceed the amount of natural bark from the unmanured trees.

Turning now to the effect of manuring trees in order to increase the alkaloidal yield of the bark, the following analysis of the five samples will show how that object has been attained. It will be seen that all the manures have raised the value of the barks, but in different degrees; the analyses are therefore arranged according to the following order, the best being placed first:—

	Quinine	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous alkaloids.	Total
Bone manure .	3·30	1·59	·10	·38	·43	5·80
Cattle manure .	3·25	1·50	·13	·35	·41	5·64
Lime and stable manure . .	3·18	1·40	·08	·21	·48	5·35
Stable manure .	3·05	1·41	·12	·32	·38	5·28
Unmanured .	2·88	1·45	·11	·24	·25	4·93

The increase in each instance is not very great; if the unmanured be compared with the highest in the table, the quinine will be found to have an addition of only 14·58 per cent., and the rest smaller in proportion. In last year's report it was shown that a succirubra and a hybrid gave a much superior yield of quinine under the influence of cattle compost than these did, and the manure applied to them had been down only six months before the samples were taken for analysis. It is well known that officinalis is one of the slowest growers of all the cinchonas, so that it is very probable that manure requires a longer period to stimulate the yield of alkaloids in this, than it would in other species. The experiments at Dodabetta point to cattle manure and bones as the best agents (of the series tried) for manuring cinchonas; the one increased the bark per tree more than the rest, and the other increased the alkaloids in the bark, and, as both these objects are sought for by all scientific cultivators, it is very likely that the application of a mixture of the two would have still more favourable results than if they were used separately. Cattle manure is organic, and contains ammonia compounds; bones are phosphatic and consist principally of phosphate of lime. A combination of these typical manures is found in "guano," the excrement of sea fowl; it might, in consequence, be inferred that the use of this substance in cinchona plantations would be attended with an excellent out-turn. The prepared bones were made by breaking up the bones to a coarse powder and treating them with 10 per cent. by weight of sulphuric acid; this would cause the insoluble phosphate to become soluble, and therefore more readily absorbed by the plants when put in the soil. In the absence of the more expensive artificial manures, it is satisfactory to find such good bark resulting from the use of cattle manure, one that is more available on these hills than any other.

Amount of Lime in a Cinchona Tree.—After determining last year the inorganic constituents of cinchona bark, and finding lime to be the principal, I was rather astonished at the lime and stable manure not occupying a higher position in the table given in the previous section. Not only does bark contain lime, but also all parts of the tree, and as the ashes of the branches, leaves and wood had been severally estimated, an approximation could be obtained of the amount of lime removed from the soil by a full grown tree. The specimen was a twenty-year old tree of *C. succirubra*, growing at Naduvatam, the various parts were weighed and as the amount of lime in each ash was known, the percentage of lime in each part could be calculated.

		Ash. Per cent.	Lime in ash. Per cent.	Lime. Per cent.
Stem bark, 21 lbs. Root bark, 5 lbs.	26 lbs.	3·50	32·8	1·14
Branch and twig .	5 lbs.	4·00	32·8	1·31
Leaves	2 lbs.	5·00	27·7	1·38
Wood	200 lbs.	·27	15·0	·04

Bark of stem and root	4·74 ounces.
Bark of branches and twigs . .	1·04 ,,
Leaves	·44 ,,
Wood of stem and root	1·28 ,,
	——7·50

The tree contained 7½ ozs. of quicklime, or nearly 10 ozs. of pure slaked lime, equivalent to more than 12½ ozs. of the "chunam" of this country.

Renewal of Ledgers.—In two former reports I have shown the effect on hybrid Ledger bark after being twice and three times renewed. It was seen that the renewal was richest in the first and second years, but not so much in the third. I have this year received from the same estate in the Ouchterlony Valley the fourth sample, and for comparison its analysis is quoted, together with the figures of former years.

	Quinine.	Other Alkaloids.	Total.
Original bark . .	1·35	5·87	7·22
First renewal . .	2·46	4·22	6·68
Second „ . .	3·60	3·99	7·59
Third „ . .	3·87	3·71	7·58
Fourth „ . .	3·03	3·98	7·01

Thus, a fourth renewal may be borne by a Ledger, but with a decrease in the richness of the bark as compared with previous years. It cannot, however, be called a poor bark with 4 per cent. sulphate of quinine and 7 per cent. total alkaloids. The bark is in a better condition than when it was first renewed, and it would be of interest to continue the experiment to know how long it could be renewed with profit.

The influence of prolonged covering.—The mossing system was introduced to encourage the growth of the renewed bark, and to protect it from the influence of the weather; for the same reason it was adopted to thicken and enrich the original bark left on the tree, and now, after repeated trials, it has been proved that both barks are really benefited by such a covering if allowed to remain on for six months to three years. But, as in original barks, if left for several years without any special protection, the alkaloids remain stationary or even decline, so in covered barks, whether "mossed" or "renewed," the alkaloids are not improved by continuing the covering longer than four or five years. The following analyses of crown barks mossed for three, seven and nine years will illustrate what has been said:—

	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous alkaloids.	Total
Renewed 9 years	3·40	·98	·34	·43	·44	5·39
„ 7 „	3·33	1·00	·32	·75	·78	6·18
„ 3 „	4·20	·85	·22	·65	·70	6·63
Mossed 9 „	2·71	1·31	·17	·55	·26	5·00
„ 3 „	3·40	1·50	·20	·45	·62	6·17

Analyses of Rarer Species of Cinchona.

	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous alkaloids.	Total
C. Anglica 1. .	4·16	·64	·27	·34	·68	6·09
„ 2. .	1·57	·47	1·40	·89	1·00	5·33
„ 3. .	1·06	1·21	·28	1·52	·54	4·61
„ 4. .	·84	·55	·38	1·02	·90	3·69
C. Verde 1. .	2·65	1·18	—	·63	·86	5·32
„ 2. .	1·58	1·17	—	1·62	·40	4·77
C. Morada . .	1·69	2·28	—	·59	·68	5·24
C. Nitida. . .	1·42	2·45	—	1·48	·67	6·02
C. Micrantha, branch . . .	—	—	—	1·60	·45	2·05
C. Micrantha, natural . . .	—	—	—	1·92	·40	2·32
C. Micrantha, renewed . .	—	2·45	—	2·12	1·02	4·59

C. Anglica.—No. 1 was from a private estate at Naduvatam, and the others were from different plots on the Government plantations, Naduvatam; all except the first are probably hybrids.

C. Verde.—No. 1 is from a young tree growing in the Wynaad. No. 2 is four years old, from the Nilgiris; it is poor for its age, and its alkaloids are not at all representative of a *Calisaya*.

C. Morada.—This sample came from the same estate as the last, and is of the same age; from its analysis it appears to be a hybrid.

C. Nitida.—This is one of the "Grey barks" of commerce, and is noted for containing cinchonine. Its composition, however, most resembles succirubra bark.

C. Micrantha.—This is another "Grey bark." A most interesting fact is disclosed by these analyses, and one which has, I believe, never been noticed before, namely, the conversion of cinchonine into cinchonidine by renewing. Cinchonine is the chief alkaloid in micrantha; young barks contain about 4 or 5 per cent. Broughton found 7 per cent. in one almost pure, and as the above samples were from old trees, the amount had therefore deteriorated. The renewed bark, which was very thick, was also from an old tree, and it is seen the cinchonidine predominated over the cinchonine, which reigned almost supreme in the natural bark, and the change, to all appearance, was brought about by no other means than the renewal of the bark from the cambium layer.

Votes of thanks were passed to the authors of these papers on the motion of the PRESIDENT.

The last paper was—

NOTES ON CRUDE CARBOLIC ACID AND ITS SUBSTITUTES.

BY ALFRED H. ALLEN, F.I.C., F.C.S.,
President of the Society of Public Analysts.

The general characters of carbolic acid are well known. The better qualities of the commercial product are well represented by the articles manufactured by F. C. Calvert and Company. Their "No. 1 carbolic acid" in the form of colourless crystals may be regarded as chemically pure and absolute, and free from homologous phenols, the proportion of which gradually increases in the lower grades, till the liquid known as "No. 5 carbolic acid" consists chiefly of cresylic acid, with smaller proportions of higher homologues and traces of naphthalene and other impurities. For ordinary disinfecting purposes such an article appears to be fully as serviceable as pure carbolic acid, but according to Dr. Tidy this statement does not extend to the lime compound of cresylic acid, which is said to be practically valueless as a disinfectant, whatever may be the value of the carbolic compound with lime. This view is borne out by the experience of one of the best-known manufacturers, and hence it may be accepted that in cases where the base of a carbolic powder is slaked lime the resultant "carbolate of lime" is of little value for antiseptic purposes.

Besides lime a variety of other substances have been employed and patented as bases for the manufacture of carbolic powders. Thus "Macdougall's disinfecting powder," the oldest preparation of the kind, is made by adding a certain proportion of crude carbolic acid to a crude sulphite of calcium, prepared by passing sulphurous acid gas over ignited limestone. Sulphurous acid is introduced into other powders by the direct addition of a solution of calcium bisulphite, and the use of other sulphites has also been patented. "Calvert's carbolic acid powder" is made by adding carbolic acid to the siliceous residue resulting from the manufacture of sulphate of aluminium or patent alum, from shale or kaolin. Calcium sulphate is likewise a suitable absorbent, and kieselguhr has been patented by Mr. Chas. Lowe for the stronger powders. As much as 50 per cent. of carbolic acid is readily absorbed by kieselguhr. The use of peat as an absorbent of carbolic acid has been patented by Knights and Gall. Limestone is also used as a base, and spent gas-lime has been patented by Austin. A mixture of

bleaching powder and carbolic acid recently received protection. Macdougall Brothers have patented the use of soluble salts as absorbents of carbolic acid, the resultant powder being more readily removed and less liable to choke up drain pipes than the preparations commonly employed. A step in the same direction is the "borophenol," patented by Borland, which is made by absorbing carbolic acid in dried borax.

Although the term "carbolic acid" has been extended, commercially, so as to include products consisting chiefly of cresylic acid and still higher homologues of phenol, it appears a straining of its legitimate signification to apply it to products from which the real carbolic acid has been previously extracted. This, however, is sometimes done, and "carbolic acid" and "carbolic powders" are sold in which real carbolic acid is conspicuous by its absence. But if the inexact description of cresylic acid as carbolic acid is objectionable, the matter becomes more serious when the article is purposely mixed with neutral tar oils or other hydrocarbons of little direct value as antiseptics.* This has been done in cases within my knowledge to the extent of fully 50 per cent., the "carbolic acid" and "carbolic powders" sold to corporations and local boards of health affording a fertile field for the operations of the blender.

Another illicit practice which is increasing is the complete or partial replacement of carbolic or cresylic acid from coal tar by the mixture of phenoloid bodies obtained from the tar or oil produced by condensing the waste gases from blast-furnaces burning bituminous coal. "Blast-furnace creasote oil" is now produced in enormous quantities in Scotland, and has already found an extensive application for creasoting timber, or producing the "lucigen" and "luminator" lights, and as a liquid fuel. It contains from 20 to 35 per cent. of phenoloid bodies soluble in caustic soda, as against 5 to 10 per cent. in coal-tar creasote oil of London make (Newcastle coal).

Here, then, is a cheap and abundant source of phenoloid bodies, but it is evident that the unacknowledged substitution of them for coal tar acids is objectionable, even assuming them to be comparable to the latter in antiseptic value.

Our knowledge of the phenoloid bodies extracted by caustic soda from blast-furnace creasote oil is chiefly due to the researches made in this building by Mr. Watson Smith. He found a sample of phenoloids extracted from blast-furnace tar to contain only 1·33 per cent. of real phenol boiling at 182° C., whereas the tar acids from Lancashire coal tars yield about 65 per cent. of crystallizable carbolic acid. The fraction which would contain the *cresols* (cresylic acid) amounted to 4·5 per cent. of total phenoloids. The larger fraction (10·4 per cent.) distilling between 210° and 230° probably consisted mainly of *phlorol* (mixture of the xylenols, $C_8H_9.OH$) and *creasol*,

$$C_6H_3(CH_3) : (OH)(OCH_3).$$

A large proportion of the phenoloids distilled at a temperature above 230°, but their nature requires further study. The fraction distilling above 360° gave, on treatment with soda and exposure to air, unstable colouring matters which are probably allied to the eupitonnic acid obtained from wood-tar. The tars obtained by condensing the gases from gas-producers and coke-ovens contain phenoloid bodies not unlike those of blast-furnace tar. Similarly, the crude oil or tar produced in the south of Scotland by the distillation of bituminous shale yields to soda phenoloid bodies to the extent of 1 or 2 per cent. Creasol seems to be wholly absent, but on the other hand *phlorol* is present, as also a *cymenol* ($C_{10}H_{13}.OH$) boiling at 237°, and two phenols isomeric therewith. The *pyrogallic ethers* boiling respectively at 253°, 265°, and 285°, found by Hofmann in wood-tar creasote, have also been isolated from the shale product, as also other bodies of very high boiling point which have not yet been fully examined.

These results show that a certain similarity exists between the phenoloids of low temperature tars, whether they be obtained by the distillation of wood or shale, or by the condensation of the gases from blast furnaces, coke ovens, or gas producers. In minor though important points differences exist, but they present a far greater resemblance to each other than they do to the coal-tar acids. My own experiments also show that in their analytical characters the phenoloids from blast-furnace tar approximate more closely to those from wood-tar than they do to the coal-tar acids, though more or less carbolic and cresylic acids appear to be constantly present, and the proportion of xylenols is considerable.

Here then we have apparently an article which on *primâ facie* grounds we should expect to have a high antiseptic value. It must be remembered that it was to the phenoloids of wood-tar that Reichenbach, in 1832, first applied the name of *creasote* or "flesh preserver." When, soon after, Runge discovered carbolic acid in coal-tar it was confused with the wood-tar principle, and it is probable that the antiseptic properties of carbolic acid itself would not have received such prompt and wide recognition, but for the advantage it derived from its confusion with the original wood-tar creasote of Reichenbach. In short, wood-tar creasote has been superseded by the cheaper product from coal-tar except for certain limited applications.

Hence the production from blast-furnace tar, and at a cheaper rate, of a substance somewhat allied to wood-tar creasote appears likely to furnish us with a new and valuable antiseptic. The Eglinton Iron Company are now preparing to produce the article on a large scale, and are introducing it on its merits, with a full admission of its nature and origin, instead of surreptitiously selling or using it for adulterating carbolic acid. At my suggestion, the Eglinton Iron Company have adopted for their product the name "Neosote," a word which signifies "new preserver" or "new preservative" and may serve to suggest the similarity of the article to creasote.

The Eglinton Company recognize the highly complex nature of the crude mixture of phenoloid bodies obtained by treating their blast-furnace tar with soda, and hence all their "neosote" is subjected to a process of further purification which greatly improves it. Thus the strong, disagreeable odour of the crude product is destroyed, and the highly irritating and acrid bodies are also removed. These objectionable constituents are probably identical with, or closely allied to the *cœrulignol* of wood-tar creasote, a single drop of which causes bleeding when placed on the tongue.

Refined "neosote" from blast-furnace tar is, when freshly prepared, almost as colourless as water, but it acquires a sherry colour by keeping. Experiments purposely made to test its antiseptic value indicate that it is fully able to compare with crude carbolic acid, while its caustic properties (when applied in a concentrated condition to the skin) are very much less marked than those of the coal-tar product. In short, when properly purified, neosote presents a considerable resemblance to wood-tar creasote.

But while there appears to be a useful and legitimate field in the future for the properly purified phenoloids from blast-furnace and allied tars, it is only right to state that there are already in the market products of a very crude and objectionable character, the illicit introduction of which may seriously affect the public confidence in an article which I believe has a fair future if judged on its intrinsic merits. As an illustration of the results such products yield when assayed, I may quote the following figures obtained in my laboratory. The distillation was performed on 100 c.c. of each sample, which

* Usually the crude carbolic acid of the best makers contains only a trifling quantity of hydrocarbons, but the article is not always equally good. A make of crude carbolic acid sent out in May last by one of the best known firms had so offensive a tarry odour that it was found impossible to employ it indoors.

was heated over a naked flame in a small flask with a side-tubulure, the thermometer being immersed in the liquid. A was a sample of Calvert's "No 5 carbolic acid," B was an article which was recently sent round to manufacturers of disinfecting powders under the description of "crude carbolic acid," but the analytical results show clearly that it was not a gas-tar product at all, but an exceedingly impure creasote from a low-temperature tar. C is the crude mixture of phenoloids obtained from blast-furnace tar by the Eglinton Iron Company, and even in its unpurified condition presents a marked contrast to the sample B. Sample D was manufactured from C by a process which is not yet made public, but of which distillation forms a part. It represents an ordinary quality of "neosote." E is a special product obtained from D by further refining and redistillation.

In each case the figure expressing the distillate below 200°, or the lowest temperature mentioned, includes the proportion of water stated to be present.

Colour.	A. Reddish.	B. Dark coffee-brown.	C. Coffee-brown.	D. Straw yellow.	E. Colourless.
Specific gravity .	1·0430	1·0574	1·0501	1·0328	1·0380
Water	8·5	4·0	8·0	none	none
Hydrocarbons .	0·8	9·6	2·3	1·3	—
Phenoloids . .	90·7	86·4	89·7	98·7	—
Fractional distillation:—					
P.c. distillate					
below 190° C.	13·0	—	—	—	none
,, 200° C.	90·0	—	9·5	none	36·0
,, 210° C.	96·0	—	10·0	69·5	95·0
,, 220° C.		7·5	27·0	94·0	
,, 230° C.		7·0	48·7	—	
,, 240° C.		22·0	62·7	—	
,, 250° C.		31·0	71·2	—	
,, 260° C.		37·5	76·7	—	
,, 270° C.		43·0	81·2		
,, 280° C.		47·5	84·2		
,, 290° C.		53·0	86·7		
,, 300° C.		58·5	90·2		
,, 310° C.		64·5	—		
,, 320° C.		68·5	—		

The PRESIDENT proposed a vote of thanks to Mr. Allen for this very important paper, which he was sure would be carefully studied.

Reappointment of Unofficial Formulary Committee.

The PRESIDENT said there were a few matters of business to which he would now invite attention. The Executive Committee had recommended in the annual report that the Unofficial Formulary Committee be reappointed. That Committee did not apply for any fresh grant, the former grant of £25 not being yet expended. Whilst recognizing the services of that Committee, it was only right to specially mention the names of two gentlemen, and he was sure the other members would not think him invidious in making that selection. First he wished to mention the services received from the Chairman, Mr. Martindale, and that he of all men should have been willing to go *con amore* into a work of this kind reflected the highest credit on his unselfishness. There had been also an enormous amount of work done by the Secretary to the Committee, Mr. Naylor, who was as modest as he was capable. He concluded by moving the reappointment of the Formulary Committee.

Mr. WILLIAMS, in seconding the motion, said the Committee deserved the thanks of the Conference. Of course the first year's work was more difficult than he hoped it would be hereafter, because the Committee had had to organize and arrange the plan of operations. He knew what an enormous amount of labour had been gone through, and the Conference ought to be very grateful to the gentlemen who had undertaken this responsible and very valuable work. It was a misfortune the members of it could not more frequently meet, for he understood the great amount of correspondence was a drawback to the easy working of the Committee; still it was impossible to draw gentleman from distant parts of the country to discuss personally the questions which came before them.

The motion having been carried unanimously,

Mr. MARTINDALE thanked the members for the very kind appreciation they had shown of the work which had so far been done. It was not much, but the Committee had gained a little experience which tended to give hopes for the future, and by another year he hoped there would be a greater number of formulæ prepared.

Bell and Hills Library Fund.

The PRESIDENT said it was now his pleasing duty to ask the Manchester Pharmaceutical Association to accept the contribution of books to their library from the Bell and Hills Library Fund. These books he hoped and believed would be a useful addition to the library. There was in Manchester a Pharmaceutical Association of many years' standing, as was to be naturally expected in a city like Manchester, and he hoped the young pharmacists of the neighbourhood would find this contribution of service to them.

Mr. WILKINSON, on behalf of the Manchester Pharmaceutical Association, was very glad to thank the donors of these very valuable books. The Association had existed in Manchester for a number of years, ever since 1852, with more or less success, and he hoped the present assemblage of the Conference in that town would be the means of giving it greater prosperity. He was sure these books would be much studied, and would be of great service to the students.

Place of Meeting in 1888.

The PRESIDENT then said that the Conference follow the usual practice, and that the meeting be held next year at the same place as the meeting of the British Association, which would be in the city of Bath.

Election of Officers.

Dr. THRESH then read the following list of officers for the ensuing year, suggested by the Executive Committee for the acceptance of the Conference:—

President.—Mr. F. B. Benger.

Vice-Presidents.—Messrs. M. Carteighe, C. Symes, S. Plowman and W. Martindale.

Treasurer.—Mr. C. Umney.

Honorary General Secretaries.—Dr. J. C. Thresh and Mr. W. A. H. Naylor.

Committee.—Messrs. W. Allen (Dublin), M. Conroy (Liverpool), R. H. Davies (London), D. B. Dott (Edinburgh), A. W. Gerrard (London), T. Maben (Hawick), N. H. Martin (Newcastle), F. Ransom (Hitchin), and G. S. Woolley (Manchester).

Auditors.—Messrs. W. Wilkinson (Manchester), and E. J. Appleby (Bath).

A ballot paper bearing the above names was handed in, and no other names being tendered the whole were declared elected.

Mr. BENGER thanked the members for the great honour they had done him, and for their confidence in asking him to be the President next year. However, much he might doubt the wisdom of their choice he could not doubt the kindliness of their feelings, and it was only his confidence in the continuance of that kindness which rendered him willing to undertake such responsible duties. He would promise to do his best, and trusted the Conference might not seriously suffer for what he could not help regarding as rather an error of judgment.

Votes of Thanks.

Mr. SCHACHT said he had a very agreeable duty to perform, but it was not simply a matter of form, either

in his own mind, or, he was sure, in that of anyone present. He had simply to move—

"That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, especially to Messrs. Woolley, Benger, Hart, Kemp, Gibbons and Wilkinson, for the very successful way in which the arrangements connected with the Manchester visit had been made and carried out."

All would agree with him that the continuance of the existence of the Conference depended very largely on the efforts made on these occasions by the Local Committee; an immense deal of labour fell on those individuals, and year by year the Conference was greatly indebted to them. On the present occasion all visitors and strangers had had ample proof of the care with which everything had been arranged, and the kindness and cordiality with which the arrangements had been carried out.

Mr. MARTINDALE, in seconding the motion, said this visit to Cottonopolis was an occasion he had looked forward to with great pleasure, and he had enjoyed meeting with several old friends, and especially some members of the Local Committee, very much.

The PRESIDENT, in putting the resolution, said he desired to support it with all his heart. He had received so many constant marks of attention that he could not adequately express his indebtedness to his friends in Manchester.

The motion was carried by acclamation.

Mr. WOOLLEY said the members of the Committee were deeply gratified at the cordial way in which this resolution had been received. He could assure Mr. Martindale that the chemists, not only of Manchester, but of the district, had also been looking forward to this visit with great interest. He was himself very gratified by the way in which the prospect of entertaining this Conference was taken up and looked forward to, and the arrangements made by the pharmacists of the entire district. He trusted that what had been done had tended to promote the pleasure of the members while there. Of course in entertaining a large meeting like that, there must necessarily be some shortcomings; for instance, Manchester had an evil reputation with regard to the weather, but quite recently they had been within a very few days of a water famine, so that the rain which had fallen was not altogether a misfortune. The Committee had been in communication with the weather office at Matlock, and he had reason to believe that they would have a very satisfactory day on the morrow

Mr. BENGER, on behalf of the Local Committee, also thanked the meeting for their appreciation of what had been done. It was only the accidental circumstance of his being the Local Secretary that led to his name being more prominent than that of other gentlemen, and he was sure any one else would have worked with as much earnestness as he had under similar circumstances. They were amply repaid for any trouble they had taken by the pleasure they felt at seeing so large a meeting.

Mr. WILKINSON also acknowledged the vote of thanks.

Mr. REYNOLDS said he had been asked to move a resolution expressing their grateful feelings for the splendid accommodation placed at their disposal by the authorities of Owens College, and if he added a few words it was because he had been rather intimately connected with an institution of that kind, and attached importance to the growth all over England of these great scientific colleges. There was a fitness in their meeting in that place, inasmuch as there was an affinity between the purposes of the College and their own objects, and the future would show that that affinity would have closer developments. Already in this College, *primus inter pares* of eight or ten having similar aims, pharmacy was recognized, and one of their own body, Mr. Elborne, held a recognized position in the institution. That was a matter of the greatest interest to them, and what happened there would happen a little later on in connection with that educational problem which they had not yet solved in all the other great centres. Dr. Leech's admirable address that morning, which was especially interesting as showing how they were in touch with the sciences and arts which were not exactly within their own borders, must have interested everyone who considered what influences might bear on the future of pharmacy. The precision which had been given to the methods of diagnosis by the stethoscope, thermometer, and other means seemed likely to be followed with regard to therapeutics, so that there would be much greater certainty as to the action of drugs. They were all deeply interested in that, and it was very pleasant to know that they were recognized as having such an interest. In connection with strophanthus, Professor Birch, of the Yorkshire College, Leeds, was engaged on the investigation of a different species, which was regarded at one time as a false strophanthus, the *Kickxia africana*, and he had already arrived at most interesting results, Mr. Christy having placed a large quantity of seed at his disposal. It would thus be seen that not only there but in other institutions these investigations were going on to the great advantage of science. He begged to move—

"That a hearty vote of thanks be given to the Principal and Council of Owens College for the use of the Chemical Theatre, and to Professors Leech, Marshall and Young for promoting the success of the Conference."

Mr. DOTT seconded the motion which was also carried by acclamation.

Mr. YOUNG, of Edinburgh, said he understood there was to be a conversazione at the Exhibition building on the following day, and the Executive Committee of the Exhibition, recognizing the presence of so many strangers in Manchester, had intimated their desire that all the members of the Conference should be present as well as other strangers connected with another society; it therefore became them to return a hearty vote of thanks for their kindness. He need not say a word with reference to the Exhibition itself, which they heard of in all quarters as being one of the best which had yet been held. He had the pleasure of being present a few hours on the previous day, and never spent a more enjoyable afternoon. He had, therefore, much pleasure in proposing—

"That the best thanks of the Conference be given to the Executive Committee of the Manchester Exhibition for including the members of the Conference in their invitation to the Conversazione on Thursday evening."

Dr. SYMES, in seconding the motion, said this invitation might be taken as further evidence of the genial manner in which their Manchester friends had come forward to make their visit agreeable.

This motion also was carried unanimously.

Mr. CONROY then moved—

"That the hearty thanks of the Conference be accorded to the President for the very able and courteous manner in which he has conducted the business of the meeting."

Mr. BALKWILL had great pleasure in seconding the motion. Although he had come a long distance to attend the Conference he had been fully rewarded by the enjoyment he experienced in listening to the address, and that had been increased by the eminently courteous and happy way in which the President had conducted the business of the Conference. He felt that in some passages in that address the President had used words which would help the whole of their body throughout the length and breadth of the land, and when he spoke about the band of men who were interested in pharmacy at the commencement of the Pharmaceutical Society he could not but feel that as from time to time he had had an opportunity of coming in contact with those who were in that centre and heart of that Association, he realized that they had still amongst them men of the

same spirit. Foremost amongst these men was the President, and to him as representing that little circle, and for all his work in the Society and Conference, and in the interests of pharmacy, he did feel that in seconding this vote of thanks he was only the mouthpiece of the whole body.

Mr. SCHACHT, as the senior Vice-President present, put the motion, which was received with acclamation.

The PRESIDENT said he was perfectly incompetent properly to acknowledge this vote of thanks which had been so kindly expressed. He felt, when invited to be President, so totally incompetent for the office that, staying as he was at Ilkley, when he received the letter from Mr. Plowman, intimating the desire of the Committee, he felt that he must take a few hours to decide, and his first impression was that it would be wise to decline. But he thought that was scarcely manly, and he perhaps rashly accepted. He felt most intensely the honour which had been conferred upon him. He had given a most inadequate address, and he had endeavoured to conduct the transactions without any discourtesy to any member of the Conference. He begged to say that to meet so large, varied and representative a gathering of pharmacists as he had had the honour to preside over had been the one event in his public life which he should always remember with the greatest pleasure. They had met under signal advantages in a lofty and appropriate building, and in the city of Manchester, of which he knew but little, but where he had several treasured friends, prominently Mr. Woolley and Mr. Benger. To come there and to meet them all, and to have heard the important contributions to scientific knowledge in the papers which had been read and discussed, had been to him a matter of the most intense interest. He could not sit down without referring to the important services rendered by their friends the Secretaries. Perhaps it had not occurred to the members that gentlemen who drew up the agenda for the meetings of course could not include themselves, and hence they might, by a pure act of forgetfulness, not receive the recognition they deserved, but they owed very much to the thoughtful preparation for days and months beforehand of these gentlemen, and when the time for the meeting came the quiet and easy way in which the work went on was greatly owing to the work of these men, who, as a rule, got no formal vote of thanks. He wished, therefore, in passing, to acknowledge the great services of Dr. Thresh and Mr. Naylor, and thanked the members most heartily and sincerely for the vote of thanks they had passed.

The British Association for the Advancement of Science.

ADDRESS TO THE CHEMICAL SECTION.

BY EDWARD SCHUNCK, PH.D., F.R.S., F.C.S.

I think you will hardly expect me, even were I fully competent to do so, to review the progress of chemistry during the last half-century, for the time at my disposal would be too short, and the result at my hands, I fear, unsatisfactory. I shall prefer to call attention in a few words to the chemistry of other days as I knew it, and the chemistry of the present time as known to us all, and to point out what I consider to be the chief characteristics of each. I shall then, with your permission, point out a few of the directions in which, in my opinion, the chemistry of the future will probably be developed, and in this undertaking I shall perhaps be more successful than in the other; for to discuss the history of science requires exact knowledge; but in speculating on its future the imagination comes into play, and to imagine is easier than to describe.

When I first entered on my studies, exactly fifty years ago, chemistry could hardly be called a science—it was rather a collection of isolated facts unconnected by any consistent theory covering the whole field. Most of the important elements were known, but of the exact proportions in which they combine together we were ignorant. The law of definite proportion had been generally accepted, but so imperfect were the data then at our disposal that we may say the law was rather taken for granted than proved. The atomic theory of Dalton as explaining this law had also been adopted by chemists; but it was not unlikely that this theory, then in its infancy, might by the vigorous onslaught of a man of Berthollet's acumen have been upset, and we should then have been left entirely without a guide through the bewildering labyrinth of facts. Of any connection between chemistry and physics there was in those days no question; of any but the most superficial notions regarding the effects of heat, light and electricity on chemical substances we had no conception. The idea that chemistry could have any bearing on or connection with physiology or pathology would have been ridiculed as absurd. I cannot think of the then state of organic chemistry without feeling amused. The state of this branch of chemistry could hardly perhaps be called chaotic or rudimentary, for, after all, what had been done had been well done and neatly done, but the assemblage of facts of which it consisted was devoid of systematic arrangement; it resembled a cabinet of curiosities, the components of which stand in no recognizable relation to one another, or a miscellaneous collection of books placed in an orderly manner on shelves, but without any attempt at classification. As to the genesis of organic compounds, what would now be called absurd notions prevailed. I distinctly remember eminent chemists maintaining that no strictly speaking organic body, even of the simplest constitution, could possibly be formed without the intervention of the so-called vital force. The fact, then recently discovered by Wöhler, of the artificial formation of urea from inorganic substances, was considered as something almost miraculous—*i.e.*, as a phenomenon the like of which would never again recur. Without, however, entering into further details, I think I may, without fear of contradiction, assert that the main distinction between the chemistry of fifty years ago and the chemistry of the present day consists in this, that, whereas formerly the science dealt chiefly with the qualitative reactions, it now occupies itself principally with quantitative determinations. To have established the fact that every chemical phenomenon may be represented in figures, denoting either number, measure, or weight, such figures, when once accurately determined, remaining constant and unchanged though all time—this seems to me the crowning glory of modern chemistry. It is the firm establishment of this principle that has transformed the face of chemistry and has changed it from a mere descriptive into an exact science.

In justice to our predecessors it should, however, be remembered that this principle, though more fully developed in our own day, was not for the first time set up in quite recent times. The labours of Dalton, conducted on quantitative lines, were performed in this city of Manchester in the early part of this century. At the same time Berzelius was engaged in analysing the most important inorganic compounds and establishing the fact, not previously recognized, strange as it may now appear, that every well-defined substance has a definite chemical composition. But going still further back, we come to the alchemists. Now alchemy, if it has any logical basis at all, is founded on quantitative notions as regards matter. All metals, the alchemists said, consist of sulphur, salt, and mercury (these terms signifying not so much elements in the modern sense as qualities) in various proportions; hence their convertibility. Take copper, remove from it a certain proportion of its sulphurous constituent, and add more of the mercurial, and you have silver; repeat the process with silver, and gold results. At the time of which I speak,

though much important analytical work had been done by Berzelius, Rose, and others in organic chemistry, though the veteran Chevreul had led the way in placing organic chemistry on a quantitative basis, and the composition of the most important organic compounds—thanks to the labours of Liebig and his method of organic analysis—had been ascertained, still quantitative determinations were not considered of such paramount importance as at present. In fact, scientific thought did not run in that direction, but satisfied itself, for the most part, with the study of qualitative reactions. It was still possible to see memoirs by eminent chemists, containing not a single quantitative determination. Strange as it may seem, two able chemists, Boettger and Schoenbein, were living until quite recently, who worked and obtained valuable results without resorting to the balance, the instrument which of all others seems the most indispensable to the chemist of to-day. The balance was indeed universally employed in my younger days, but no other instrument, properly so called, was ever seen in the laboratory. The spectroscope was not yet invented, the polariscope had not come into use; volumetric analysis was still in its infancy. Even the thermometer was but seldom used. What a different picture does the laboratory of the present day present, with its instruments of precision, and its various appliances for effecting quantitative determinations of all kinds!

Whether the universal prevalence of and exclusive attention to quantitative methods in chemistry has been an unmixed good may be doubted. Who has not run with a weary eye over the long array of figures, the never-ending tables of which some modern memoirs seem to consist, and not longed for some mere description—were it only regarding trivial matters—to relieve the monotony and fix the subject treated of on the memory? That quantitative determinations given in quite precise terms may occasionally be entirely futile may be seen on referring to the history of alchemy. One of the later alchemists professes to have converted 5400 parts by weight of copper into 6552 parts of silver by the action of 1 part of a metal-improving substance (philosopher's stone). Here we see the quantitative method applied to a purely chimerical process, elaborated from the depths of the experimenter's inner consciousness, and of no value whatever. Much of what is at the present day carefully worked out and presented to the world in numerical form may, like this statement of the alchemist, pass away and be forgotten. This may possibly be the case with the numerous carefully made analyses of water which we now meet with, and which we would gladly exchange for a few decided qualitative tests of its hygienic properties. In the case of air and water it is not the minuteness of the noxious matter which causes doubts to arise, but the absence of any decided and undoubted chemical characteristics of the impurities present. It is probable that a refined sense of taste, uncorrupted by the luxurious indulgences which civilization has introduced, would be able to detect differences in drinking water which might escape the attention of the most consummate analyst.

Whatever objections may, however, be entertained to the application of quantitative methods in natural science, to the exclusion of others, it is certain that important results have flowed from their adoption, insomuch that we seem to have arrived at the conclusion that the expression of quantitative results is the be-all and end-all of science; that all differences are merely quantitative; that there is no such thing as mere quality. The whole philosophy of our age is expressed in this one proposition: All differences within the sphere of our experience are quantitative. It is the basis of Darwinism, if I am not mistaken, and underlies many of our political and social theories. Of course it is a mere assumption if stated generally, for the phenomena that admit of purely quantitative expression are few in number compared with those that do not; but then it is surmised, and with some degree of probability, that the vast region outside the quantitative sphere will in time come to be included within it. The past history of science seems to render this likely in the future. The science of chemistry has so far, however, presented an insuperable barrier to the general adoption of this view, and will continue to do so as long as the so-called elements remain what we now admit them to be—indestructible, immutable, inconvertible. It is possible to denote all the known properties of gold and silver, their atomic weight, specific gravity, hardness, malleability, action towards heat, light, and electricity in precise numbers with reference in each case to a certain standard, and yet we cannot say that silver minus a little of this, plus a little of that, constitutes gold—the two elements are essentially and radically distinct. Unless we admit with the alchemists that by taking away a little of A and adding a little of B we can convert one metal into another, one element into another, the quantitative method must fall short of its complete development of chemistry. Numerous attempts have, therefore, been made to show the theoretical probability, even if it should not be possible to prove it experimentally, of the so-called elements being really compound bodies, or at least of their containing a basic matter common to all. My predecessor in this chair has endeavoured to show in the brilliant address delivered to this Section on the occasion of its last meetting that the barrier hitherto presented to us by the intractability of our present elements may be overcome, and has adduced experimental illustrations in favour of his views of the compound nature of the elements. Mr. Crookes has called to his aid the doctrine of evolution, which has proved so valuable an instrument in the hands of the biologist, maintaining that the elements, like the species of plants and animals, were gradually evolved by some process of condensation from a primordial matter called by him protyle, each step in the process being represented by a distinct element. This is doubtless taking very safe ground, for if the process of evolution was the same in the inorganic as it is supposed to have been in the organic world, the process can never be repeated, and we shall, therefore, never be in a position to illustrate it experimentally. I may, however, have misunderstood what Mr. Crookes meant to convey, and, if so, must apologise for the dulness of my apprehension. Granting, however, the possibility of our resolving our present elements, were it in theory only, into modifications of one basic material out of which they have been evolved, the question would still remain to be answered, What has caused this primordial matter to be split up into groups and forms having distinct and opposite qualities? and when this question is answered, if it can be answered even in a problematical way, then other questions would arise, until by degrees we should arrive at the confines of physical knowledge and find ourselves in the region of metaphysics, where scientific reasoning ceases and thinking for scientific purposes becomes unprofitable. Excursions into this region would indeed be very useful if on returning to physical regions we could every time bring back with us an instrument as potent and far-reaching as the atomic theory has proved to be, a theory which still remains the basis of all our reasoning in chemistry, but then the atomic theory has been quite an exceptional instance. Metaphysical speculation, such as the Naturphilosophie of the Germans has dealt in, has, generally speaking, been utterly barren in natural science.

(*To be continued.*)

* Kopp, *Die Alchemie.*

Obituary.

Notice has been received of the death of the following:

On the 25th of July, at Townsville, Queensland, from tetanus, the result of a fall from his horse, Mr. Thomas Ridgley, Chemist and Druggist.

On the 12th of September, Mr. John Northway, Pharmaceutical Chemist, Theobald's Road, London. Aged 65 years. Mr. Northway had been a Member of the Pharmaceutical Society since 1853.

On the 21st of September, Mr. Charles Goode, Pharmaceutical Chemist, High Street, Congleton. Aged 57 years. Mr. Goode had been a Member of the Pharmaceutical Society since 1857 and for several years filled the office of Local Secretary.

On the 22nd of September, Mr. Septimus William Barton, Chemist and Druggist, Nevill Street, Southport. Aged 69 years. Mr. Barton had been associated with the Pharmaceutical Society since 1872.

On the 24th of September, Mr. John Rowland Sturton, Pharmaceutical Chemist, Peterborough. Aged 48 years. Mr. Sturton had been a Member of the Pharmaceutical Society since 1864.

On the 24th of September, Mr. William Stubblefield Barton, Chemist and Druggist, Moreton Street, Belgrave Road, London. Aged 59 years.

On the 24th of September, Mr. John Wilson, Chemist and Druggist, Harrogate. Aged 65 years. Mr. Wilson was formerly for nearly twenty years a Member of the Pharmaceutical Society, having joined it in 1853.

On the 25th of September, Mr. Alfred Woodliffe, Chemist and Druggist, High Street, Bridlington. Aged 43 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE FUTURE OF PHARMACY. OUR CRAFT IS IN DANGER.

Sir,—The curriculum bill will not pass; we cannot prevent companies dispensing; elegant pharmacy is being monopolized by "enterprising firms," and our legitimate profits are being eaten up by severe trade competition; with the silversmiths of Ephesus, therefore, we may well cry out "our craft is in danger," or, in the language of to-day, "the trade is doomed." As a trade I believe it is. "The future of pharmacy" is, I know, an endless theme, but I venture to make a few remarks thereon. Of the four troubles I have named the first two are for the Pharmaceutical Council to deal with; the other two for each individual among us as best he can. Everything seems to point to a severance of the chemist from the mere druggist, the semi-profession from the trade, the latter being swallowed up by the grocer; the sundry and manifold pickings of Mr. Proctor's jackal (see *Pharm. Journ.*, vol. xii., p. 220) being now almost entirely devoured by the grocery and oil shop lions who can easily considerably undersell us and get a, to them, fair profit, and at the same time a gratuitous advertisement. So we must compete with these intruders on their own ground as tradesmen (which is what Mr. Proctor said six years ago) and trade on commercial principles at prices which are at present chiefly ruled by Stores, Whiteley and Co., and positively unremunerative; or, what seems the wiser alternative, relinquish such trading to those who care to have it, give increased attention to true pharmacy, give up the grub and chrysalis form of traders and semi-traders, and develop into the full-blown professional butterfly. We may well be content to let go the work of mere distribution, and I believe, if we do not, shall only hamper the efforts of pharmacy to rise to its true position. Both Mr. Carteighe at the dinner and Mr. Atkins at Manchester hinted that "in purely business relations" we have no chance. Then what shall we do? Scientific pharmacy in the form of research and elaborate manipulation is only for the few; dispensing as at present carried out is for a limited number only; therefore it seems the only opening for pharmacy, and which I suppose will be its ultimate position, is to relieve the general medical practitioner of his dispensing work, and he would, I feel sure, in many, if not most cases be only too glad to be rid of it. I fancy two chief obstacles to such a course are, first, the objection of the public to pay a double fee for medicine as well as advice, and secondly, the doctor's objection to his prescription being repeated indefinitely without his leave, he thus losing a visit each time. The latter objection can be avoided by the prescriber stating on the prescription that it is not to be repeated, an order which any pharmacist would respect; but the former objection could only be overcome by chemists charging much less than is now necessarily the custom, a sacrifice, however, which would be well repaid by getting the public to understand going to the pharmacist for medicine and the doctor for advice; such an arrangement, moreover, would reduce to a minimum the medical bugbear of counter-prescribing. Are there not languishing (more or less) up and down the length and breadth of the land a considerable part of some 14,000 legally qualified and skilled dispensers, with time, vigour and every desire to take up the work? Are there not also as many, or perhaps twice as many, medical practitioners who, after long and anxious work in a much more important field of labour, have small inclination or energy left to give to the lesser, but still responsible work of dispensing, and either do not give it full justice or relegate the duty to some person unqualified for the task? If only the Medical Council, the all-powerful *Lancet*, or some other influential medical agency could be induced to take up, recommend and bring about this matter, the large number of chemists and druggists now pining for (not to say out of) work would be employed, pharmacy would receive such an impetus that a new occupation would be found for "our boys," who could be drafted in great numbers to the mill at Bloomsbury, where exists any amount of valuable machinery for turning out chemists duly "hall marked" by the gross—the medical profession would be relieved of what is to them drudgery, and have so much the more energy to pursue their vast and ever expanding studies in the science of medicine proper, and the community at large be correspondingly benefited thereby, as also by the presumably improved physicking it would get by this division of labour. Cannot, somehow, the "sister-professions," who now only nod and make complimentary after-dinner speeches at arms' length, be brought closer so as to clasp hands, and thus by bringing in contact the opposite poles of the medical battery complete the circuit, and generate a spark of vitality, an electric current which shall flow through and vitalize the dry bones of pharmacy, and at the same time materially assist the whole medical profession.

20, *Boundary Road, St. John's Wood.* J. J. CHAPMAN.

J. Mitchell.—(1) *Solidago virgaurea.* (5) *Achillea ptarmica.* The labels of the remainder had fallen off on arrival. They are *Prunella vulgaris, Centaurea nigra,* and *Potentilla Tormentilla.*

J. H. Williams.—The substance forwarded consists not of seeds, as you suppose, but of dried fragments of the plant. According to Mr. W. G. Smith the paste, when examined under a microscope, is seen to consist of one or more of the yeast fungi (saccharomyces) in a mucilaginous medium.

F. C. F.—Your unsatisfactory result was probably due to the introduction of water. According to Watts, acetate of amyl may be prepared by distilling 2 parts of acetate of potassium, or 3 parts of dehydrated acetate of lead, with 1 part of strong sulphuric acid, and 1 part of amylic alcohol, agitating the distillate with milk of lime, then dehydrating over chloride of calcium and rectifying.

W.—(1) *Stellaria media.* (2) *Achillea Millefolium.* (3) *Polygonum aviculare.*

J. B.—Probably the seeds of *Galium aparine.*

"Tar Product."—See a paper on the "Chemistry of the Antiseptics," by Mr. Bickerdike, in *Pharm. Journ.*, [3], vol. v., p. 541; also Lunge on "Distillation of Coal Tar," and the articles on the subject in Payen's 'Applied Chemistry' and Watts's 'Dictionary.'

W. H. Reed.—They differ in one containing potash and the other ammonia.

T. F.—In the case as stated there seems to be some confusion between the prescription and the copy of it. The latter is a memorandum made by the chemist for his own purposes, and is his property and not the patient's.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Fritz, Stockvis, Kay Bros., Heron, Chem., Inquirer, Absinthe.

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The most easily assimilated Food in Wasting Diseases.

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Preferred to all Makes hitherto used.

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Far superior to any others in use at present. Unequalled for purity in composition, solubility in coating, uniformity in size, perfection in form and finish. This coating contains no resinous gum or any ingredient that in the slightest degree interferes with the solubility of these Pills, and the following advantages may be noticed :—*They never crack or split. The coating does not peel off. They are moderate in price. The ingredients are carefully selected, and of unimpeachable quality. The transparent coating, which dissolves in about half a minute, is put on while the mass is soft, thus keeping the Pill in a perfectly soluble condition without employment of any heat. The coating, which is unimpaired by age, is quite transparent, and the taste of the Pill is perfectly covered. The excipients chosen tend to preserve the soluble character of the Pill, and increase the medicinal effect of the drug.*

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TERMS—Net one month, or 5 per cent. for cash with order on amounts exceeding 20s. On opening accounts, cash is required.

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No. in Price List.		1 lb. tins coated. £ s. d.	1 lb. tins uncoated. £ s. d.
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2	*Pil Aloes et Assafœtidæ.* ,, ,,	0 6 0	0 5 0
3	*Pil. Aloes et Ferri* . . ,, ,,	0 6 0	0 5 0
4	*Pil. Aloes et Myrrhæ* . ,, ,,	0 11 6	0 10 6
6	*Pil. Assafœtidæ Co.* . . ,, ,,	0 6 0	0 5 0
7	*Pil. Gamboge Co.* . .		
8	*Pil. Coloc. Co.* (Scam. Virg.) ,, ,,	1 2 0	1 1 0
	Ditto, with Resin Scammony . .	0 14 0	0 13 0
9	*Pil. Coloc. et Hyos.* (Scam. Virg.) gr. 4 and gr. 5	0 19 0	0 18 0
10	*Pil Coloc. et Hyos.*, with Resin Scammony	0 14 0	0 13 0
11	*Pil. Ferri Carb.* . . . . . gr. 4	0 5 6	0 4 6
13	*Pil. Hydrarg.* . . . gr. 4 or gr. 5	0 4 9	0 3 9
14	*Pil. Hydr. Subchlor. Co.* . . . gr. 5	0 6 6	0 5 6
15	*Pil. Ipecac. et Scillæ* . . . . gr. 5	0 7 0	0 6 0
17	*Pil. Plumbi c Opio* . . . . . gr. 4	0 11 0	0 10 0
18	*Pil. Quiniæ* . . gr. j. gr. ij. gr iij.	Subject to mkt. fluctuations.	
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Claims to be a Specific for all Congestive and Inflammatory conditions of the Respiratory Apparatus, and will be found efficacious in

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Inflammation and Congestion of the Lungs, Pneumonia, Pleurisy, Whooping Cough, Croup, Diphtheria, Pharyngitis, Laryngitis, Catarrh, Sore Throat, Quinsy, Enlarged Tonsils, Hoarseness, Loss of Voice, Colds in the Head, Ozœna, Hay Fever and all other Complaints of the Respiratory Organs.

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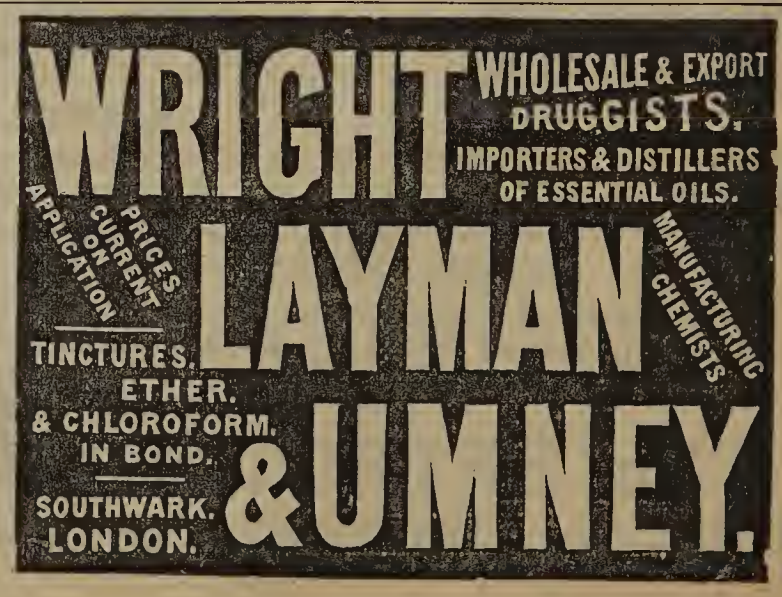

WINTER SEASON, 1887-8.

Kay's Family Reference Almanack, 1888.

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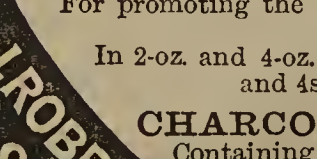

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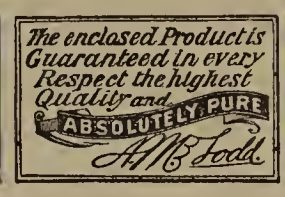

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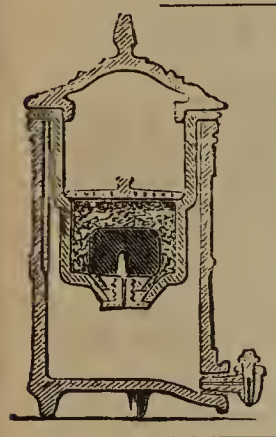

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27 Sept., 1887.

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Valuer, Transfer Agent & Accountant,

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Dorset.—Good market town. Returns £950, and increasing. Nett profits £300. Price £750. Handsomely fitted. Little opposition. Recommended.

South Coast.—Old-established Retail and Dispensing. Good Proprietaries. Price about £1400.

East Coast.—Retail and Dispensing. Returns £600. Price £500. Agency nearly pays rent.

Cornwall.—Old-established Business. Returns average £950. Price about £950. Good position.

London, W.—Retail and Dispensing, under manager. Owner bought large business. Price £450.

London, S.W.—Retail and Prescribing. Returns £500 by assistant. Price £250. A bargain.

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VALUER, LEICESTER,
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Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

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Valuers, Transfer Agents & Auctioneers
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Established 1870.

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Manchester.—Price about £700. Midlands.—£600. Devon.—£800 to £1000. Kent, Surrey or Sussex.—£700 to £1200. *Cash* clients ready to purchase. Particulars in confidence.

MARK SMITH, Chemist,
Valuer and Transfer Agent,
LOUTH, LINCOLNSHIRE.

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MESSRS. ORRIDGE & CO., Chemists' Transfer Agents, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. Orridge & Co. has been known as a Transfer Agency in the advertising columns of the Pharmaceutical Journal since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

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1. London, N.—Main road. Bus and trams pass the door. Dispensing, Prescribing and Retail. Returns last year £660. Increasing. Shop well fitted in mahogany and good stock. Price about £635.
2. London, S.E.—Family Retail and Dispensing Business, situate in a good business locality. Very old-established. Returns over £1000 yearly. Position good. Good house and beneficial lease. Full particulars on application.
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4. London, S.E.—Prescribing, Dispensing and light Retail. Held by vendor 8 years. Returns average nearly £850. Well fitted shop and good stock. Good house. Price about £800.
5. Essex.—Unopposed good country Business. Returns over £600, at full prices. Good house, garden and warehouse. Rent small. Genuine concern. Price £400.
6. Suffolk.—Good town. Retail and Dispensing Business. Returns nearly £800. Well fitted shop. Large house and small garden. Vendor having purchased another business will deal liberally with an immediate purchaser.
7. Warwickshire.—Retail and Dispensing Business. Returns over £600. Net profits £220. Shop well fitted, and good stock. Convenient house. Moderate rental, &c. About £500 required.
8. Western County.—Small country town. Good class Retail and Dispensing. Returns nearly £1450. Over £500 net profits. Large house; good garden, greenhouse, stable, &c. About £1300 required. References must be enclosed.
9. Home County.—Near town. Good class Dispensing and Retail. Returns at present about £450; rapidly increasing. Net profits over £200. Commanding corner position. Price about £300.

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Belvoir, Grantham, Dec. 1st, 1879.

SIRS,—Elliman's Royal Embrocation is used in my stables; I think it very useful.

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From Lord Haddington, Tyningham, Prestonkirk, N.B.

December 27, 1885.

SIRS,—Elliman's Royal Embrocation is used in my stables, and I consider it *indispensable* in any stable, but especially in the stable of a Master of Hounds.

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Sold by Chemists and Saddlers, in Bottles, 2s., 2s. 6d., and 3s. 6d.

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From the Mother Superior, House of Mercy, Horbury, Wakefield.

March 10th, 1886

MESSRS. ELLIMAN,—We use your Universal Embrocation in our House for Rheumatism and Sprains; also among the Miners it is known as well, and appreciated as much as by ourselves.

Yours truly,
THE MOTHER SUPERIOR, S.S.P.

Extract from a Letter received from Mr. Geo. Pattrick, Hon. Sec. Hartlepool Athletic Association.

May 19th, 1886.

"With respect to your Universal Embrocation, I may say that some of the members of our Rovers Football Club swear by it, and not only use it for sprains, contusions, &c., but rub it all over the body after a match; when I tell you our Rovers Club is one of the best in the North of England, and that we have five members in the County team, you will see that the Universal Embrocation has a reputation here.

"Yours obediently,
"G. PATTRICK."

"We think it very handsomely got up."

pro J. WILLIAMS, 6, Burcough Street, Ormskirk.

Sept. 12, 1887. D. C. W.

"Please accept my thanks for the handsome metal tablet."

Sept. 22, 1887. J. H. PEARSON, Chemist, Peterboro'.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 902.] SATURDAY, OCTOBER 8, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 9th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, Nov. 2nd, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 2nd day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 5th, 1887.

There are at present *forty-six* annuitants, receiving £1575 per annum, and casual relief is also granted, amounting to upwards of £600 per annum, involving a total annual expenditure of about £2200.

The following is the scale of pensions :—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

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And to increase in the same proportion.

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And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-SIXTH SESSION, 1887—88.

COMMENCING OCTOBER 3rd, 1887.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.
Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

Professor WYNDHAM DUNSTAN.....CHEMISTRY.
Professor ATTFIELD ....PRACTICAL CHEMISTRY.
Professor GREEN ....BOTANY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.
Mr. HOLMES ....MATERIA MEDICA.

CHEMISTRY.

Lectures on Monday, Tuesday and Wednesday mornings, at 9 o'clock, comprising the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.
3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures. First Course, October to February. Second Course, March to July.

PRACTICAL CHEMISTRY.

Daily, at 10 o'clock, in the Laboratory, by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore enter for any period at any date. A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

BOTANY.

Lectures on Friday and Saturday mornings, at 9 o'clock, comprising the following subjects:—

1st Course.—Structural Botany, and the Physiology of the plant. October to February.

2nd Course.—Structural and Physiological Botany, but with especial reference to Practical Botany and the Classification of plants. March to July.

All the lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

MATERIA MEDICA.

Demonstrations in Vegetable and Animal Materia Medica every Thursday Morning, at 10. First Course from October to February; Second Course from March to July.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations every Tuesday, Thursday and Friday, at 5 p.m. First Course from October to February. Second Course from March to July.

Application for admission to the School, for Prospectuses, or for further information, may be made, personally or by letter, to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

THE PHARMACEUTICAL JOURNAL

Guaranteed Circulation of 7000 Copies Weekly.

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ASSISTANTS SEEKING ENGAGEMENTS *only* — Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.

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2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

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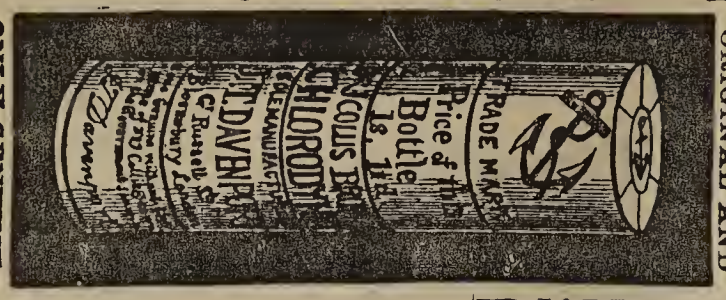
ONLY GENUINE.  ORIGINAL AND

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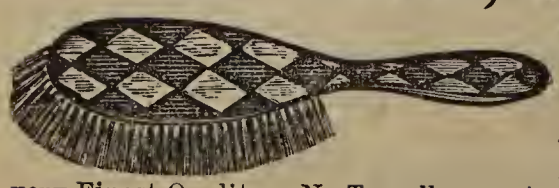

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DELIVERED AT THE COMMENCEMENT OF THE FORTY-SIXTH SESSION OF THE SCHOOL OF PHARMACY,

October 5, 1887,

BY SIR DYCE DUCKWORTH, M.D.,

Physician to St. Bartholomew's Hospital; Treasurer of the Royal College of Physicians.

Mr. President, Ladies, and Gentlemen,—I take it as a considerable compliment that I have been invited to deliver to you the Inaugural Address of this Session. I long ago made it a rule of my life not to refuse any duty which came before me, provided that I felt it at all within my power to do it, and although I am as conscious as anyone that many more fit persons might fill my place to-night, I venture to accept the position offered to me, and to do my best not to mis-spend the few minutes at my disposal. First, I may claim some small right to address you on this occasion, because the subjects of materia medica and pharmacy have always had great attractions for me. I may say that I was drawn towards medicine by a love, for its own sake, of the healing art, and I, consequently, approached my profession from its therapeutical side. I have never lost my interest in this part of the physician's art. It is too much forgotten in these days that the two main duties of the physician are first, to discover exactly what is wrong, and, secondly, to apply measures for relief and the promotion of cure.

A complete diagnosis is but half of his work. I repeat, therefore, that the reason for a physician's existence in our social system is that he shall treat disease with a view to cure it.

I had the good fortune to be taught by several masters of therapeutics and pharmaceutical art. In Liverpool I was trained first under Baker Edwards, and subsequently under Birkbeck Nevins. At Edinburgh I diligently attended the prelections of Christison, illustrated profusely by the resources of the great University Museum. One of my first medical books was 'Gray's Supplement to the Pharmacopœia,' edited by Redwood, your eminent Emeritus-Professor, and at an early period of my studies I made almost every salt and preparation in the Pharmacopœia of 1851. Hence, I may at least claim some acquaintance, though, indeed, what I might term a pre-scientific one, with the lines of your present and future studies here, and I can offer you some sympathy, and a not unintelligent interest in your pursuit of them.

And now, having said too much about myself, I may pass on to welcome, in the name of the Society, its Officers and Professors, all those who present themselves on these benches to-night for the first time. I know well what must be the feelings of many of you. You have come from distant homes, it may be, to this vast and busy metropolis, with good heart and purpose to try and lay a solid and worthy foundation for your future careers. You have done wisely and well. If your relations have made an effort to secure for you the great advantages offered by this Society, they may feel sure that they are giving you the best help, and are promoting in the best way your potential usefulness in the future. You have to prove yourselves worthy of any sacrifice they may have made for you, and you will do this by beginning at once, to-morrow, to display energy and earnestness in your work. I lay stress on your setting to work at once. If a freshman is languid at his first start, he too commonly proves a failure ever after. Take my word and my experience for it, the man who buckles to, forthwith, on his entry into a school will be the man who will come out well, if not brilliantly, at the end of his curriculum. London with all its scientific life, its feverish and intense fervour, has also its seamy side, and innumerable traps are set for such as you who come here from simple, honest, God-fearing homes. I bid you beware of these beguiling gins, and always remember the eternal truth contained in the words of the wise King who wrote that, "Surely in vain the net is spread in the sight of any bird." Thus warned, you will not be entangled by the seductions of idle companions, and you will be worthy of yourselves and of those who love you best. Steady and regular work will well avail to keep you in good company and to unfit you for courses unworthy of English gentlemen. Take St. Jerome's advice: "*Facito aliquid operis, ut semper te diabolus inveniat occupatum.*" That unpleasant complaint home-sickness, too, is best cured, as I well remember, by hard work. Having drifted somewhat into a by-way of moral therapeutics, I must next offer in the names of your President and officers hearty congratulations to those of you who have come forward to receive prizes. It is always pleasant to succeed, and it is always wise to try to succeed. One success in life, especially at the outset, is very apt to lead to others. There is, however, ample compensation for those who, having tried, have failed to reach the full measure of attainable success. Their efforts do not fail to be fruitful, though their crop of successes may ripen later on. I find little sympathy for those who do not strive or aspire to excel in their work, yet I suppose there must be always some easy-going people in the world, and, indeed, there are not plums enough that everyone may secure one in the struggle.

I pass now to refer to some changes that are in progress amongst you. I have already mentioned the name of Dr. Redwood, your Emeritus-Professor of Chemistry, a name honoured by pharmacists all over the world. Dr. Redwood is the Nestor of your body. You have, as your senior professor, Dr. Attfield, a man whose energy and excellence are known to me on several accounts, and not least because, as a member of the Pharmacopœia Committee of the Medical Council, I come into relation

with him as the Reporter on the British Pharmacopœia.

Your Professor of Botany and Materia Medica has retired, and in Mr. Bentley you lose a well-known teacher and authority in those subjects. I am glad that his place is now worthily filled by Professor Green, but it is always painful to see familiar faces drop out of the ranks. You can still be thankful you have had Mr. Bentley, and you can rejoice that he retires as Emeritus-Professor, with plenty of working power left in him.* In pure chemistry and chemical physics you have the advantage of a teacher so eminent as Professor Dunstan has proved himself to be. In Mr. Holmes you have an instructor in materia medica who is recognized as an authority on the subject, while pharmacy is in the able hands of Mr. Joseph Ince. But in addition to your long-established courses of study here, I have especially to congratulate you on the higher flights to which you properly aspire.

In your new laboratories for research you seek henceforth to do work which falls well within your power, work which hitherto has been so laborious as to be almost prohibitory, and perhaps not strictly within the legitimate lines of investigation, for many of those who have pursued them. I refer to purely chemical, botanical, and pharmaceutical work, which up to this time has mainly been done individually by eminent members of your Society, and occasionally by a few therapeutists who were specially qualified to do it.

This is not within the limits of therapeutical research, properly so called. But so elaborate and tedious is this work, that years must elapse before a practising physician and teacher can compass the complete pharmaceutical research necessary for any one new drug. Henceforth, you will achieve this in your new laboratories, and give the *imprimatur* of this Society to your pharmaceutical researches, thus setting free therapeutic investigators to their proper studies.

Such subdivision of labour is now inevitable, and with the impetus your work here will give to therapeutics proper, we may fairly anticipate useful results. To endow, as you propose to do, such higher research, is, indeed, a very worthy use to make of any funds you may happen to accumulate.

In reviewing, as I may, the position of the pharmacists of this country during the last quarter of this century, I cannot fail to be struck with the great advance made in your work both as a science and an art. I note the improved quality of the work done, no less than the higher social position and characters of the men who have accomplished it and now keep the forefront.

I recall the ordinary druggist of my boyhood, and while remembering that he was almost always a worthy, intelligent, and kindly man, I know now that he was too commonly an imperfectly educated and untrained man, even in his own department. In many parts of the country, if not, indeed, so forlorn a person as Romeo's apothecary, he was more dependent by far on ancillary parts of his business than is now, happily, the case. His guaiacum bottle was very blue, and his liquorice root very hard (as I knew to my personal discomfiture), his nitrate of mercury ointment was not unlike choice Gorgonzola cheese, and there was little of the vesicatorial element left in his bottle of lyttæ. Without doubt, a very altered state of matters now prevails. In the smallest town to-day may be found members or associates of your Society, and your diploma carries with it such credentials as entirely satisfy the medical profession and those of the laity competent to judge (not too many, by the way) of the high degree of competence that has been certified in the possessor of it. Not only is confidence felt, and rightly felt, as to the training and skill of your diplomates, but there is something better, if possible, than this, and that is, an assurance that your Society alone certifies those who by high personal character, moral rectitude, and a fine sense of honour, are fit to be intrusted with the important public duties pharmacists are called to discharge. I take it therefore, always and everywhere, that the possessor of your diploma is an honourable, well-educated, and dependable man, and I am entirely content to trust him.

These considerations lead me at once to offer some remarks upon a delicate matter, but one which has been recently brought into prominence in respect of the Apothecaries of England and Ireland. I refer to the dispensing of medicines by members of my own profession.

I had hoped that this system was likely to come to an end, and believed that the necessity for it was hardly any longer existent. Other views have, however, prevailed. I hold the opinion that the necessity for this practice is now very small anywhere in the towns, and not so pressing as is believed in country practice. There can certainly be no doubt that, with the increasing numbers of highly qualified pharmacists that issue from the schools of London and Edinburgh, the necessity becomes annually, and everywhere, much lessened.

I affirm, without hesitation, the fact that your diplomates, as a rule, are better fitted to act as public dispensers than members of my profession, and I can therefore only express the hope that you may steadily wrest this sphere of work from men

* I may here express my regret that botany is now ejected from the curriculum of medical students who do not aspire to university degrees. I protested against that decision, my belief being that the mental training of botany was peculiarly fitted to prepare the student for the practice of medicine, not in virtue of any specific and direct knowledge of plants thus acquired, which is soon forgotten, but because of the habits of observation and discrimination necessarily entailed by this study. Its omission, too, as a part of general biological training I take to be very serious.

who have already too much else to do and think about, and who are less well-qualified than you to do it. I am aware that fears have been expressed that if you took over the dispensing duties of medical practitioners generally, you would be tempted even more than you now are to engage in treating disease both on your own premises and outside them. For my part I entertain no such apprehensions. On the contrary, I feel every confidence that your temptations in this direction would be diminished, and that you would abide more constantly in your own proper sphere. My experience cannot be singular in respect of finding that the higher the qualifications and attainments of pharmacists the less do they step out of their proper line of duty. To put it plainly, the better the pharmacist the less counter-prescribing he engages in. To put a complete stop to this practice I believe to be impossible. The poor and humble are less in fault here amongst your customers than the wealthy and well-born, as you and I very well know. However amiss may still be the practical workings of our political economy there is assuredly no lack of dispensary service for the former, and our younger physicians are not wont to be too busy, if called upon, to minister to the latter.

You ought, as I am sure you often do, and will more and more, to relegate these ignorant and miserly applicants respectively to their proper channels of relief. In any case I feel sure you want none of these people, and they are never good for legitimate business.

You have my sympathy in witnessing the degrading and mischievous system of cheap dispensaries which is spreading so largely in all directions, a system altogether unworthy of my profession, and fraught with little, if any, benefit to the applicants. The only lessons for us to be learned from such improprieties are patience and increased continuance in uprightness and high-mindedness. *Nil fictum est diuturnum.*

I wish to allude in the next place to the somewhat frequent change of names which chemists are in the habit of making in the inorganic materia medica. This is perplexing and certainly of no practical avail to the medical practitioner. It is interesting now to read what was written just fifty years ago on this subject, by the late Dr. Graves of Dublin, one of the most eminent physicians and teachers of his day:—

"Let me now advert to a serious inconvenience which the chemists have imposed upon the medical world. They have, it appears, not only assumed to themselves the privilege of naming our medicines, but also changing those names every five or six years. I find that most chemical substances have in the space of fifty years, undergone at least five changes. Of course, as the march of chemistry progresses with accelerated speed, we may give our nomenclators credit for an increased tendency to revolutionize the chemical vocabulary, and conclude that they will change them five times within the next fifty years.

"In 1890, how will a man be able to recognize a substance whose name has undergone ten mutations? I am anxious to dwell on this defect as being pregnant with perplexity and confusion. It would almost seem as if some enemy to our profession had invented the chemical nomenclature for the purpose of retarding the advance of practical medicine. . . . . We should come forward boldly and declare that we will not be made the slaves of names. . . . . I therefore assert boldly that much benefit would accrue from reverting to the old system, and employing names which have no direct reference to the substances."*

In the foregoing paragraphs, Dr. Graves made no allowance for other revolutions which work side by side with those he so vigorously declaimed against. The wheel of fashion revolves as certainly as does that of progress, and many of us have lived long enough to see that things once discarded, names amongst them, in deference to supposed scientific advance and requirement, quietly come back again and fall into their old places. We daily discover, also, that our forefathers were not all unwise men, and that in some ways, with all our boasted advances, we are really smaller men. It is at all events the case that in our recent Pharmacopœias, the synonyms of important preparations are given. This is not sufficiently carried out, and I would urge that the alternative synonyms be given as large print, and as full recognition, as the purely chemical names which are so apt to be changed either from caprice or from advance of knowledge.

To take an example,—calomel, for the practical physician, will always be calomel, whatever the chemists may call it, and the physicians of 2887 must be enabled to know what agent we in 1887 made use of under the name. We must always have regard to posterity, and we too much forget our duties to those who have to follow us in the various callings of life.

I think it is a matter of regret that we have on our tables 'extra' and unauthorized pharmacopœias.

Such volumes might well be issued, authoritatively, from time to time by the Medical Council between the editions of the British Pharmacopœia. I am not alone in thinking that our Pharmacopœia should contain the names and descriptions of many more drugs than are now found in it, together with the best directions for their several pharmaceutic preparations. We do not look to the Pharmacopœia for directions how and when to use drugs, but we do require authoritative and skilled pharmaceutic indications respecting them. Hence, I object to the periodical omissions of drugs which are made in succeeding editions. I thus lose a measure of authority for the employment of remedies I have learned

* Introductory lecture, session 1837. 'A System of Clinical Medicine,' p. 31. Dublin: 1843.

to set store by and depend on. No one may tell me I am no longer to use a certain drug because it is expunged from the Pharmacopœia; but if it be so expunged, many pharmacists will consider themselves excused from retaining it on their shelves, and I risk the imperfect dispensing of a prescription. Happily, the list of omissions in the last Pharmacopœia was not a long one.

In thus expressing my opinion, I am not unmindful that I am at variance with that which was so ably laid before you in this place by my distinguished predecessor last year. He was especially apprehensive as to the overloading of our armoury with new and untried weapons, and so far I am fully in accord with him. But I have my doubts as to the exclusion of old and long-tried remedies, some of which have possibly not had fair trial by modern practitioners, and have been crowded out in the race after new things.*

There is a great tendency now to employ concentrated preparations, and to use drugs singly. This results from laboratory rather than from bedside research. There is less polypharmacy now than formerly, but I am satisfied that there is also less good prescribing than in my student days. The art of combining drugs has been much lost, and I think the practice of physic is by so much the poorer.

I have no doubt that these opinions will prove shocking in some quarters, but I am here simply to state what I believe to be true. It is, I think, certain that some drugs are more effectual in combination with others than when given by themselves. This is, however, a matter for the medical practitioner rather than for the pharmacist, albeit, the latter must acquire an accurate knowledge of the compatibilities of drugs, and, for this purpose, not only must he study the materia medica proper, but also so much of the subject of therapeutics as can be conveyed in systematic teaching here.

Objection has been taken very recently, in a quarter whence better things might have been expected, to the study of materia medica and theoretical therapeutics at the hands of pharmacists. To implant such knowledge as this, it was affirmed, would be to equip pharmacists to treat disease, and grave apprehensions were accordingly raised. The best reply to such objections as these is to be found in the simple history of this Society. I suppose there has never been a time since its foundation, nearly half a century ago, when the subjects alluded to have not been carefully taught here. I cannot suppose, for instance, that the late Dr. Pereira taught materia medica here without also teaching to his classes such therapeutic knowledge as he deemed essential, and I will leave it to Mr. Bentley to say what was his practice in this respect.

The medical profession should have no fears or apprehensions respecting the learning and attainments of pharmacists, and if such there be in any quarter, so much the worse for that profession.

I believe that the position of pharmacists on the continent of Europe is a somewhat higher one than in this country. It is recognized more distinctly by the Governments. The education demanded is very thorough, and many of the pharmacists are accomplished scientific chemists.* On the continent, professional positions, generally, count for more than with us. If your status to-day is not all that it ought to be in this country, I am not prepared to say where the failure lies. Good scientific work generally asserts itself, and comes to the front. It may be doubted whether our younger pharmacists pursue their science with the energy and thoroughness of their French and German *confrères*. There are certainly wanting opportunities, sufficiently lucrative in an expensive country like this, for young men, duly qualified, to pursue chemical and pharmacological researches for their own sake in a scientific spirit. Such opportunities are afforded on the continent, and are largely availed of. We find the fruits of these in the numerous synthetical products which crop up daily, more especially in Germany.

The direct consequences are more fruitful still to that country, and as depletory to our own. Such facts are plainly discreditable to us, and we sit still and accept them as if all was inevitable. I would ask, can our wealthy chemical manufacturers do nothing to wipe out this reproach? Are we calmly to continue to look to Germany as the chief source of some of our most largely used productions? I say, No. I refuse to believe that we cannot supply our own demands for such drugs as chloral hydrate and salicylate of sodium.

It is a libel on our manufacturing capacity, and an injustice to large classes of our operatives to affirm such inability. I am told that we are handicapped in various ways, as by the expense of labour here, and by a practically prohibitive duty on alcohol for manufacturing purposes. I think a fair representation of the case in a proper quarter would soon lead to a remission of such prohibitive duty, and the question of labour would not long press. The prevalence of severe competition in the drug trade has no doubt much to answer for in many ways. The trade has now assumed enormous proportions. It is ever a mystery to me how the population of the globe, vast as it is, manages to consume the physic

* *Sir Henry Acland made particular reference to the retention of musk. I should have much regretted the omission of that drug. I use it largely, and have a high opinion of its value in certain conditions. I wish to have a strong tincture of it made officinal, containing about* 5 *grains in each drachm.*

* They are not, however, permitted to prescribe for the sick. I was on one occasion led to imagine they did. On looking into a very beautifully designed and decorated *Apotheke* in the mediæval city of Nuremberg, I saw painted over an inner door the following ambiguous inscription:—*Pax intrantibus, Salus exeuntibus.*

which is hourly being prepared for it. One may charitably hope that the waste is greater than is apparent, yet the actual consumption is enormous, both of legitimate and of illegitimate physic. I apprehend that competition is a good deal to blame for the importation of low-priced foreign drugs.

For cheap drugs, as for all cheap things, I have small regard. It has always appeared to me a solemn farce to employ any remedy of inferior quality. There should be no two qualities of important and powerful drugs. If these are to be of avail, none but the best should be employed. I feel sure that much skill and time are lost owing to bad drugs, and the consequences may sometimes be serious. So far I have only spoken of drugs of inferior quality. I shall say little respecting adulteration. We have now an Act in force which works fairly well, but it is probable that it should be more searching in order to abolish this criminal practice. The labour of detection is so great, and the penalty on discovery so lenient, that the only practical protection to the consumer is regard to the honour and standing of the producer. Drug business is one of confidence, and woe to him who degrades himself to forfeit his integrity and honour.

I must ask your pardon if I refer, lastly, to a great modern influx of preparations which are hardly to be called drugs, and must assuredly not be called foods.

I do not know what term to apply to the strange combinations I allude to. I take up any medical journal, and find about one-half of its pages filled with advertisements of the messes I am referring to. I shall not enumerate any of these. I know, and intend to know, nothing about ninety-nine out of every hundred of them. I read of subtle combinations of physic and food, of the most ingeniously devised arrangements of almost every element that can be found in the human body. I read, too, that these preparations are designed to meet certain demands, and further, I find testimony from members of my own profession to the effect that they are likely to fulfil these demands, or have actually fulfilled them. With respect to these very numerous wares, I have to say that I recognize no place for most of them, and that I think they are harmful in various ways, not least in preventing patients who get them from securing a proper dietary and proper medication.

Food is one thing, and physic is another. The one should come fresh and redolent from our mother earth to be incorporated into our material frame; the other, when it is required at all, should fulfil whatever purpose may be in view. I am sorry for any patient who cannot take fresh, or freshly prepared, aliment, and I seldom see any whose requirements cannot be met in this fashion. I do not say that food and medicine may never be given together, but I do affirm that if this must be, the medicinal agent should be freshly added as required. I, therefore, regard most of the preparations I have alluded to as unnecessary, unwholesome, and as constituting a retrograde step in the art of the pharmacist, and I regret to find even the measure of approval they so often obtain from my profession.

Not only are the pages of medical journals crowded with these advertisements, but they teem also with recommendations of numerous remedies which are foisted on us from America. Your art has reached a high state of excellence in that great country, and solid contributions have come from the labours and ingenuity of American pharmacists. I fail, however, to see why their preparations of our commonest drugs should overflow from their vast continent into our little island, and commend themselves to the public as against our own productions.

While speaking of American pharmacy, I will add that I think it little less than an indelicacy and an impropriety, that in a public place, in London, which I will not mention, it should be possible for a child, or for anybody, to possess himself in exchange for a humble coin, if dropped into a piece of mechanism, of potent, and possibly mischievous, medicine. Degradation of pharmaceutic business can hardly step lower than this. Let us hope to see no extension at the hands of Englishmen of such catchpenny vulgarity.

I think there is a too prevalent sale of proprietary medicines, and I should like to find this practice steadily growing less. I think no educated chemist should be the medium for distributing the vaunted nostrums, produced by designing speculators for the purpose of extracting money from credulous and ignorant persons, and I do not regard this as legitimate business for men who seek a high place in the confidence of the public.

In respect of some of the business practices which I notice are carried on by pharmacists, especially in suburbs and country towns, I may refer to the sale of homœopathic remedies. I consider this very improper and misleading to the public, and I always regard it as no better than the display of a flag of distress on the part of those who vend such rubbish. No educated pharmacist can lend himself to the propagation of error, and retain his self-respect.

I am quite unaware that any solid contributions to the art of pharmacy have ever been made by homœopathic druggists, and I cannot believe that this Society approves of its members or associates vending their wares. Let it be remembered that such business is virtually carried on under the ægis of this Society. For my own part, I should carefully avoid any pharmacist who conducted it.

Surely the art of advertising has now reached its climax. Let me counsel you to have as little to do with it as possible. It must be that you become business men as well as professional men. The high ideal taught you in the latter and higher capacity here must ever hold in check and temper your conduct as men of business. There is no incompatibility between these two relations. You have

excellent examples set you here in London, and in every large town. Aim high, and carry your aspirations high, and you will not fail to reach exalted places.

Begin as you mean to end, and pursue no line of practice that you may afterwards be ashamed of, and seek to drop. Industry, patience, rectitude, these three qualities will carry the youngest of my hearers to a good and honourable place in due time.

In bringing these observations to a close I must again ask your pardon for any plainness of speech I may have used. I have not come here merely to say things that I thought would please you, but I confess that I have availed myself of the privilege of addressing you to-night to state what I believe to be true, and to require stating, and I therefore venture to commend to your best attention the remarks I have made.

I do not believe that you will regard me as inimical because I tell you the truth, but I will very gladly hear any solid objections which may be made to my assertions and suggestions; and in any case, I will say, lastly, that this Society, its officers, its members, its associates, and its pupils have my best wishes for their long-continued prosperity and national usefulness.

THE SPECIFIC GRAVITY OF AQUEOUS SOLUTIONS OF GLYCERINE.

BY W. W. J. NICOL, M.A., D.SC., F.R.S.E., F.I.C.,

Lecturer on Chemistry, Mason College, Birmingham.

Having occasion, in the course of experiments on the nature of solution to determine the specific gravity of definite mixtures of glycerine and water, I was struck by the great discrepancies to be observed in figures given in the text-books for the density, not only of the pure substance, but also of its aqueous solutions.

Thus the density of anhydrous glycerine is variously stated by different authorities between the limits 1·25 and 1·28. The two best determinations being those of Mendelejeff and Lenz.

1·26 at 15° C. water, at 4° = 1
1·2610 at 15° C. water, at 15° = 1 } Mendelejeff.

and

1·2691 at 13° C. water, at 13° = 1, Lenz.

Matters are still worse in the case of aqueous solutions; thus a solution, specific gravity equalling 1·204 at 13°—15°, is stated to contain—

80 per cent. glycerine . Fabian.
79 „ „ . Metz.
80·3 „ „ . Scheikert.
74 „ „ . Champion and Pellet.
75·9 „ „ . Lenz.

As glycerine is now of very considerable commercial importance, and it seemed probable that a reliable table of the specific gravity of its aqueous solutions would be of some value, I have endeavoured to supply such an one.

The glycerine employed was proved to be free from dissolved salts and all impurities except water. It was then dehydrated by heating under a pressure of 50 mm. till the boiling point was constant at 210° C.

As the distillation of the large quantity (3 kilos) I required for my solution experiments would have been an exceedingly tedious operation, I decided if combustions of the residue in the retort gave satisfactory results to forego its further purification. The combustion gave—

Carbon . . . . . = 39·05 per cent.
Theory $C_3H_5(OH)_3$ . . . = 39·13 „

This was considered sufficient, for as 1 per cent. of water would lower the carbon to 38·74 per cent. it was evident that the glycerine was practically anhydrous.

With regard to the other sources of error. The solutions were made in weighed stoppered bottles, a portion of glycerine being introduced and weighed. The requisite weight of water, calculated for the required percentage, was then added by weight and the whole mixed; the weighings were all made to the nearest half milligram. The error in composition varied from ±·0001, *i.e.*, 0·01 per cent. for the 10 per cent. solution, to ±·00005, *i.e.*, 0·005 per cent. for the 50 per cent. solution.

The specific gravities were determined in Sprengel tubes at a temperature of 20° C. in a constant temperature bath; the temperature never varied more than 0·05° C., and the error in density was less than ±0·00002 per cent. The specific gravities are therefore reliable to the *fourth* decimal place at least.

The following are the results:—

100 per cent. glycerine specific gravity = 1·26348
90 „ „ „ = 1·23720
80 „ „ „ = 1·21010
70 „ „ „ = 1·18293
60 „ „ „ = 1·15561
50 „ „ „ = 1·12831
40 „ „ „ = 1·10118
30 „ „ „ = 1·07469
20 „ „ „ = 1·04884
10 „ „ „ = 1·02391
Water at 20° . . . . . = 1·00000

From these the following table is calculated:—

Specific gravity t° = 20° = 68° F. Water at 20° = 1.

P. c.	Specific gravity.	P. c.	Specific gravity.	P. c.	Specific gravity.	P. c.	Specific gravity.
100	1·26348	75	653	50	1·12831	25	166
99	091	74	381	49	558	24	1·05908
98	1·25832	73	109	48	285	23	651
97	572	72	1·18837	47	013	22	394
96	312	71	565	46	1·11741	21	139
95	052	70	293	45	469	20	1·04884
94	1·24790	69	020	44	198	19	630
93	526	68	1·17747	43	1·10927	18	377
92	259	67	474	42	657	17	124
91	1·23990	66	201	41	387	16	1·03872
90	720	65	1·16928	40	118	15	622
89	449	64	654	39	1·09850	14	373
88	178	63	380	38	583	13	126
87	1·22907	62	107	37	317	12	1·02880
86	636	61	1·15834	36	051	11	635
85	365	60	561	35	1·08786	10	391
84	094	59	288	34	522	9	148
83	1·21823	58	015	33	258	8	1·01905
82	552	57	1·14742	32	1·07994	7	664
81	281	56	469	31	731	6	423
80	010	55	196	30	469	5	184
79	1·20739	54	1·13923	29	207	4	1·00945
78	468	53	650	28	1·06946	3	708
77	197	52	377	27	685	2	471
76	1·19925	51	104	26	425	1	235

The Pharmaceutical Journal.

SATURDAY, OCTOBER 8, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE INAUGURAL SESSIONAL ADDRESS.

As an outspoken estimate of the present condition of pharmacy in this country, and of the tendency of the changes that have taken place in regard to it during the last five-and-twenty years, the address delivered last Wednesday evening by Sir DYCE DUCKWORTH may be commended to the careful perusal of all who are practically engaged in that occupation, but more especially to those who are anxious or doubtful as to its future prospects. It is satisfactory to note, that, speaking as a physician, in reference to the chief impression produced by a comparison of the present with the past, he recognizes the fact that there has been a great advance, and it is no less satisfactory to find the influence of the Pharmaceutical Society credited with the general improvement that has taken place in everything relating to the qualification of pharmacists. But though it is true that there are even in the smallest towns throughout the country men possessing credentials which entirely satisfy the medical profession as to their fitness for the work appertaining to their calling, the dispensing of medicines is still to a very large extent carried out by members of the medical profession. This is an anomaly that cannot fail to have a discouraging influence for the time being, and in some degree to justify a passing doubt as to the utility of higher qualification. But when the origin of the system of medical dispensing is fully considered, it must be admitted that there are great difficulties to be overcome in its reform. It is certainly some mitigation of the disappointment experienced by pharmacists who hoped to see that system done away with, to find that it is unreservedly admitted by a medical authority that the necessity for the practice of dispensing by medical men is hardly any longer existent. It is true that view is not accepted by the entire profession, but when it is expressed by eminent representatives of that body in so decided a manner as it was last Wednesday evening, both by Sir DYCE DUCKWORTH and Dr. GREENHOW, there is reason for believing that the advance which has been made of late years in pharmaceutical qualification will yet be continued in the future by the compensatory transfer to the hands of pharmacists of a large portion of the dispensing work now being done by medical men. Certain it is that until that change be effected to a considerable extent there can be little hope for the future of pharmacy, either as an occupation or as a means by which the public can be secured the supply of some of its most urgent necessaries.

In the course of the address a very fitting rebuke was addressed by Sir DYCE DUCKWORTH to those who contend that the transfer of dispensing from medical men to pharmacists is unadvisable, because it would provide temptation to engage in the treating of disease even to a greater extent than at present. The experience referred to as his own in this respect must, we feel sure, be that of most who have taken the trouble to notice facts; and it is indeed but reasonable to expect that the higher the attainments of the pharmacist, the higher his qualification for the performance of his legitimate duties, the less likely it would be that he should willingly step outside the sphere of his proper duties. It is want of due occupation within those limits that provides temptation to exceed them, and though it may be taken as an established fact that the better the pharmacist the less he engages in counter prescribing, it cannot reasonably be expected that there can be a general extension of these conditions among pharmacists who are debarred from occupation in their proper line of duty. So far as counter prescribing is an evil, and we have never sought to dispute that in many instances it is a serious evil, medical men are at least as much to blame for it as the individuals who engage in it.

Closely connected with the mutual grievances of medical dispensing and counter practice, is another circumstance referred to by Sir DYCE DUCKWORTH in his address that illustrates a want of wholesome relations between certain classes of medical men and the pharmaceutical community. The objection lately raised to the study of materia medica being included in the curriculum of pharmaceutical education, is one so narrow-minded and ill-judged that it might well be said better things might have been expected from the source whence it came. With such a precedent as is furnished by the teaching of materia medica to pharmaceutical students by the late Dr. PEREIRA, it cannot be possible to maintain that there is reason for grave apprehensions of pharmacists being thus equipped for and led to usurping the physician's prerogative in the treatment of disease. On the Continent, moreover, where the duties of both medical men and pharmacist are more strictly and appropriately regulated, and where the mutual relations between the two bodies are more naturally sympathetic than is too often the case here, the teaching of materia medica is nowhere looked upon as a source of dangerous interference by pharmacists with strictly medical functions. But we have still to attain to that desirable condition, which, happily for the interests of medicine, of pharmacy, and of the public, obtains with most

of our Continental neighbours. Among ourselves it is still necessary that the proposition as to the absence of fear or apprehension by medical men respecting the learning and attainments of pharmacists should be expressed in the suggestive form, and for the present we can only hope for the time when the general establishment of better relations between the two classes may admit of its being stated less conditionally.

THE TEACHING OF PRACTICAL PHARMACY.

In the discussion that took place at the Council meeting last Wednesday, on the question as to the establishment of a laboratory adapted for the teaching of practical pharmacy, one point at least appeared to meet with general recognition, viz., that such a step might, and very probably would, become necessary by reason of the deficiency of any other means by which a knowledge of practical pharmacy can be obtained in this country. If we may judge from the remarks made on the occasion referred to, it would appear that very many pharmacists have not the means of teaching practical pharmacy, and that those who have are for the most part indisposed to undertake the task of teaching apprentices. This state of things in regard to pharmaceutical practice betrays a want akin to that affecting the chemical manufacturing industries of the country, which are being paralysed by the influx of chemical products from Germany, generally cheaper than they are produced here, and often much better. The extent to which this has come to be the case since the Great Exhibition in 1851 requires to be seriously taken into account by those who are interested in and dependent upon British industries. At that time there were scarcely any works of the kind we understand as chemical works in Germany; we supplied that country with alkali, acids, bleaching powder, etc. There were scarcely any iron works such as were common in England. Now and for years past the number of chemical factories of all kinds has become enormous in Germany. Meanwhile the iron industry and coal mining may be said to have come into existence, and certainly the commercial ability, as well as the technical knowledge of German manufacturers, have not only enabled them to provide from local sources for wants that were formerly supplied from this country, but have also been the means of establishing a competition with English manufacturers which is becoming more and more ruinous to our home industries. For much of this disadvantage we have to blame the defects in our educational system, and the inflated notion that our command of material resources would continue to enable industries to be carried out successfully upon a mere rule-of-thumb, unintelligent system. So far as pharmaceutical products are concerned, not only Germany, but America, pour into this country vast supplies, which meet with an amount of trade success that is as much a reproach to British pharmacists as the depletion of other of our manufacturing industries by foreign competition is to those who direct them. It may be therefore that the only hope of maintaining our position in practical pharmacy is the establishnent of means for teaching the art in such a manner as is contemplated in the motion brought forward by Mr. Symes.

The distribution of prizes to successful students of the School of Pharmacy was this year marked by the unusual circumstance of an award of the Society's Silver Medal to a female student, Miss Margaret Elizabeth Buchanan, who had obtained the second rank in the examination for the Pereira Medal.

* * *

In the brief remarks made by Brigade-Surgeon Hooper, when receiving the Hanbury Gold Medal on behalf of Professor Dymock, he took occasion to express not only his sense of the distinction conferred upon his colleague individually, but also the feeling that this award would be regarded as reflecting honour upon the entire Indian Medical Service, and as a further incentive to the work of others in the vast field of research which India afforded. This is the fourth award of the Hanbury Medal, its previous recipients being Professor Flückiger, the late Mr. John Eliot Howard, and Professor Dragendorff.

* * *

The first meeting of the eleventh session of the Chemists' Assistants' Association will be held at nine o'clock on Thursday evening next, at 103, Great Russell Street, W.C., when the Inaugural Address will be delivered by the President, Mr. T. S. Dymond. It may be useful to mention that the Council of this Association has decided to change the day of meeting to Thursday, in order that throughout the coming session the meeting may be held on the same day of the week. A programme of the meetings to the end of the year has been issued.

* * *

The classes of the winter session to be held in connection with the Midland Counties Chemists' Association will commence on Monday next, the 10th inst. Courses of lectures on Chemistry and Physics, on Botany and Materia Medica, and on Pharmacy, will be delivered at the Educational Chambers, New Street, Birmingham, by Mr Stokes Dawson, Mr. Alcock, and Mr. Perry, in pursuance of the desire to furnish means of instruction for apprentices. Arrangements will also be made for the formation of a class for Practical Dispensing, if a sufficient number of students be forthcoming.

* * *

We are informed that Messrs. J. and A. Churchill are now in a position to supply both the 6*d*. and 1*s*. copies of the 'Unofficial Formulary.'

Transactions of the Pharmaceutical Society.

MEETING OF COUNCIL.

Wednesday, October 5, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Evans, Hampson, Hills, Newsholme, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Woolley.

The minutes of the previous meeting were read and confirmed.

Letter from Mr. Bosisto.

The PRESIDENT read a letter which had been received from Mr. Joseph Bosisto, Melbourne, thanking the Council for the honour conferred upon him in electing him an honorary member of the Society, and adding that the announcement of this honour would be received by all Australian pharmacists with great gratification.

The Hanbury Medal.

The PRESIDENT also read a letter from Brigade-Surgeon Dymock, expressing his high appreciation of the great honour conferred upon him in awarding him the Hanbury medal, and expressing his regret that he was unable to attend personally to receive it.

A letter had also been received from Lieutenant-General Allen Johnson, Military Secretary, India Office, saying that Brigade-Surgeon W. R. Hooper would attend to receive the medal for Professor Dymock.

ELECTIONS.

MEMBERS.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society.

Greenshields, William.....Petersfield.
Onion, John .....Birmingham.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Eyval, Thomas Brown .....Prestonkirk.
Merrick, Charles James .....London.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Brassington, Herbert William..Rugeley.
Grice, Joseph E. Brindley .....Brighton.
Robins, Harry Hollies.....Dudley.
Shera, William Arthur .....Horncastle.
Watt, Arthur .....Edinburgh.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Austin, William Hosking .....Devonport.
Baudwin, Raymond Farnese ...New Southgate.
Bulmer, Bethel.....Pickering.
Coleman, Thomas. .....Bicester.
Cox, William Francis .....Hipperholme.
Curtis, Wallace Edward .....Hatch Beauchamp.
Field, John Faram Victor .....Batley.
Green, Herbert John .....Deal.
Harper, Florence Jane .....Birmingham.
Hopkinson, Walter .....Leicester.
Horne, George Herbert ... .Scarborough.
Hunt, Frederic Hastings.....London.
Hutchin, Llewellyn Albert Jas. Saffron Walden.
Jackson, Thomas Bigland .....Kendal.
Jenkins, Owen John .....Neath.
Jessop, Sam .....Brighouse.
Marchant, David .....Eastbourne.
Marr, John Charles.....Hull.
Mills, Charles Thomas .....Shipston-on-Stour.
Myers, George .....Welton.
Oliver, Irwin.....Liverpool.
Polley, Thomas E. .....London.
Sandbrook, John .....Market Drayton.
Vawser, Arthur .....March.
Webber, Ernest Distin .....Tunbridge Wells.
Weston, Chennell.....Hastings.
Whitfield, George.....Scarborough.
Wilson, William .....Walthamstow.
Woodcock, Bertrand Joseph ...Newark-on Trent.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the "Register of Chemists and Druggists":—

Henry Finch, 1, Knowsley Parade, Cheltenham.
Henry Powell, 233, East India Dock Road, London, E
John Henry Wilson, High Street, Tewkesbury.

ADDITIONS TO THE REGISTER.

The Registrar reported that—

Joseph Only Curtis Church, Acle, Norfolk, and
Charles Wilkinson, 47, Watergate Street, Chester,

having respectively made declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported, their names had been placed on the Register.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee included a recommendation authorising the payment of a further sum not exceeding £1000 to the contractors for the new buildings, on the architect's certificates.

The PRESIDENT moved the adoption of the report and recommendations, explaining some of the items.

Mr. ROBBINS seconded the motion.

Mr. RICHARDSON asked when it was expected that the new building would be completed.

The PRESIDENT said it was hoped that the examinations in December would be held in them.

Mr. HAMPSON said he understood at the last meeting that each member of the Council was to be furnished with the financial statement.

The PRESIDENT said the Committee had considered the matter on the previous day, and came to the conclusion, without making any definite report, that the subject should be discussed that day in committee of the Council. The majority of the Committee took one view, but, as one member took another, it was thought better to leave it to the Council.

Mr. HAMPSON asked if it was necessary to go into committee on the matter?

The PRESIDENT said that was the suggestion.

Mr. HAMPSON said some men had a great faculty for figures, but others, of whom he was one, had not. He could not carry a number of figures in his head and bring them out at a minute's notice; he required to have something before him, and he could not see why every member should not have a copy of the financial statement furnished him. The Society had possibly arrived at the highest

point of prosperity; at any rate it behoved the Council to be very careful in its expenditure. It was engaged in a large building undertaking, and possibly something more might be done in the same direction; but at any rate it would be much better for each member to have all the points of finance before him, and he was astonished to find that the Finance Committee had not unanimously agreed to the suggestion made last month. The President had the financial statement in his hands, and in his opinion it would be a good thing if each member were placed in the same position, so that their attention might be called to the different items.

The PRESIDENT said the question was whether the Council would adopt the suggestion of the Committee, and consider the whole matter in committee.

Mr. HAMPSON remarked that the report of the Committee did not refer to this matter.

The PRESIDENT said the Committee did not report upon it.

Mr. HAMPSON asked why there was no report?

The PRESIDENT said it was out of courtesy to the minority.

Mr. HAMPSON did not suppose the minority were ashamed of their convictions, and the report ought certainly to contain a statement that this matter had been discussed, for it might slip out of memory, and be forgotten. There was no record at all of the discussion.

Mr. EVANS said he was in a hopeless minority on the Committee, and then the President suggested that the matter should be discussed at the General Purposes Committee, and then it was suggested that it should be considered by the whole Council in committee; and he thought this was the best way. He had nothing to add to what he had said on the previous day; but looking forward to the future, no doubt there would be men in the same position as himself coming forward, possibly every year, men who did not know what had been going on, and if for no other purpose than to give new men information, it would be well to have the facts on record.

Mr. RICHARDSON did not see any serious objection to the course proposed, any more than there was to the Benevolent Fund statement, which was now handed round monthly, and to which the same objection was made when it was first suggested, and which had proved to be of great use. They were all responsible for the finances of the Society, and he was afraid they were drifting into a system of expenditure which would have to be considered very seriously in future. The new building involved a very heavy expenditure, and would involve expense in its maintenance, and it therefore behoved them to be careful, and to know exactly the position in which they stood. He had the greatest faith in the President and the Treasurer, but he thought it would be advisable for all the members to have more information on financial points, if it could be done without objection.

The PRESIDENT then moved that the Council go into committee.

Mr. HAMPSON said he would move as an amendment to the report, that a minute of the discussion which had taken place in the Committee be added to it.

The PRESIDENT said the Committee made no report, and there was no division upon the subject; each person gave his views, that was all.

Mr. HAMPSON, with all respect to the Committee, thought this was rather a slipshod manner of doing the work. If a matter of this kind were discussed some record of it should appear.

Mr. SCHACHT thought he was responsible for the actual course adopted. Seeing the general feeling, it was perfectly clear that if the Committee had come to a decision, Mr. Evans, who was the mover in the matter, would have been defeated. It then occurred to him that it would be better to allow those who were not on the Finance Committee to express their opinion on the matter. Although he did not feel that any great benefit would result from providing these monthly statements, yet if the majority desired it, it might be wise to do it. He would remind Mr. Hampson that there was no obligation on the Committee to report immediately on the question referred to it; it was quite competent to defer the matter for another month.

The PRESIDENT said he would now put the motion for going into the Committee.

Mr. SYMES asked if it were necessary to go into committee to discuss the matter.

The PRESIDENT explained why it would be much more convenient that such a discussion should take place in committee. It was essentially a subject for conversation, question and answer, not for a regular debate. The object was to let every member of the Council know as much as possible, and it was a question of how it could best be done.

Mr. WOOLLEY asked if the question could not be considered in open Council. They had to deal with funds entrusted to them by members and the trade generally, and if any subject ought to be discussed openly it was this.

Mr. SCHACHT said they had no right to discuss the administration of the funds, or the conduct of the Committee which the Council had appointed.

Mr. EVANS said the President had already ruled that it was not a Finance Committee.

Mr. HILLS said it was just because there was a feeling of uncertainty what the Finance Committee was that rendered it desirable to go into committee and have the whole matter thoroughly explained. There was nothing behind the scenes, but it was a matter essentially of detail. Mr. Evans on the previous day had not put anything very definite before the Committee; it was merely a question whether some little matters of detail were practicable. It was not a question of spending money.

Mr. SYMES pointed out that as the Committee had made no report, there was nothing to prevent the discussion being taken in open council. There was really very little to discuss, and he had been astonished that the members of the Committee had not seen their way to furnish the information desired.

Mr. RICHARDSON asked the President if he would not be able to speak with the same lucidity and fulness in open Council as in committee? Of course they did not wish to hide anything from their constituents, but there were occasions when it was desirable to discuss matters in committee.

Mr. ATKINS thought it would be a great pity if any impression got abroad that there was anyone there in favour of taking things *in camera* which ought to be made public, or of not allowing the greatest possible publicity where the interests of the Society were promoted by it. In this case he thought the discussion would naturally take a conversational form, and would be better taken in committee. He understood Mr. Hampson's request to be that the report of the Committee should be amended to the extent of including a record that there had been a conversation on this subject in the Committee, and that seemed to him very desirable.

Mr. ALLEN remarked that during the conversation in committee on the previous day Mr. Evans, who brought forward the matter, was unable to furnish the Committee with the exact detail of what he desired; there was no definite scheme put forward. He ventured to think that the paper giving particulars of the applications to the Benevolent Fund bore no comparison to what could be furnished by the Finance Committee; it only showed the claims, not the evidence upon which the claims were adjudicated.

After some further conversation it was resolved, on a division, to go into committee and discuss the matter.

A long discussion ensued, but in the result the majority of the Council were not in favour of introducing any change in the present practice.

On resuming, the report and recommendations of the Finance Committee were unanimously adopted.

BENEVOLENT FUND.

The minutes of this Committee included a recommendation of the following grants:—

£5 to the widow (aged 63), of a registered chemist and druggist, who died suddenly leaving his widow totally unprovided for. (Worcestershire.)

£10 to the widow (aged 57), of a member from 1841-1882, and a subscriber to the Fund from 1875–1882. Applicant is in poor health, and endeavours to support herself by letting lodgings. (Hampshire.)

£10 to the widow (aged 43), of a life member, having seven children, five of whom are wholly dependent on her, and one partially so. (Bedfordshire.)

£5 to a registered chemist and druggist (aged 65), in very feeble health and unable to earn anything. Applicant has had three previous grants. (Lancashire.)

£10 to the widow (aged 41), of a registered chemist and druggist, having eight children dependent upon her. Applicant had a similar grant in June, 1886. (Somerset.)

£5 to the widow of a registered chemist and druggist (aged 66), in delicate health, who had a similar grant last year. (Devon.)

£5 to a registered chemist and druggist (aged 54), whose defective sight prevents his obtaining employment. Has had two previous grants of like amount. (Devon.)

Two applications had been deferred, and six the Committee had declined to entertain.

The Secretary had submitted a statement showing the receipts and expenditure during the year, viz., from January 1 to September 30, showing a balance in hand of £720 8*s.* 6*d.*, which it was estimated would be brought up to £1090 by the end of the year by further subscriptions and interest on investments, out of which £787 10*s.* will have to be paid to annuitants up to January, 1888. In October, 1886, there were forty-six annuitants; six were elected in December, and six have since died, eaving the number the same as last year. Four candidates were unsuccessful at the last election, one of whom has since died, and five have been placed on the provisional list during the year.

The Committee recommended that six annuitants be elected on December 2 next.

The Council went into committee to discuss with more freedom the question of how many annuitants it was desirable to elect in December next.

On resuming,

The VICE-PRESIDENT moved the adoption of the report and recommendations, which was seconded by Mr. BOTTLE, and unanimously agreed to.

The next Election of Annuitants.

Mr. CROSS then moved—

"That six annuitants be elected on the Benevolent Fund, and that the election take place on the 2nd of December next."

Mr. ALLEN seconded the motion.

The PRESIDENT, in putting the motion, said that while expressing, as he had done on previous occasions, the gratitude of the Council for the support given to the Fund at the dinner and in other ways, he wished to remind the subscribers and the trade generally of the conditions under which it was administered. By the existing Bye-laws it was necessary that all donations should be invested, and therefore the handsome sums received during the past year in donations did not increase the available income to anything like the extent which might be supposed. While the donations thus received would make a handsome addition to the invested capital, and make the position in future more secure, he trusted that friends would remember that if the Council was to continue adding to the list of annuitants, and giving relief in cases of distress, they must keep up their *annual* subscriptions, and if any could increase them the Council would be very grateful. The annuitants obtained their income from two sources. The old principle was never to grant an annuity unless there was sufficient capital invested to guarantee it; but some years ago the Council thought it might trust to the generosity of the trade at large as much as to invested capital, and that a large number would prefer to subscribe something which would do good during their own lifetime rather than that it should be hoarded up for the benefit of the future, on the principle of letting each generation take care of itself. By this resolution the number of annuitants would be raised to over fifty, and it was right that friends should understand that while the Council was extremely grateful for what they were doing, and particularly for the fact that a very large proportion of the funds came from a comparatively small number of individuals, it was necessary to keep up their efforts to get increased annual subscriptions both in number and amount. Failing that, the time must come, and was undoubtedly approaching, especially as many of the annuitants elected in recent years were comparatively young, when it would be doubtful, if the subscriptions did not increase, whether the Council would not have to reduce the number annually elected.

The motion was carried unanimously.

EMERITUS-PROFESSOR OF BOTANY.

It was resolved that Professor Bentley be appointed Emeritus-Professor of Botany and Materia Medica, with a salary of £100 per annum.

THE TEACHING OF PRACTICAL PHARMACY.

Mr. SYMES then moved the following resolution, of which he had given notice:—

"That this Council approves of increasing the facilities for teaching Practical Pharmacy in the Society's School by fitting up a suitable laboratory for that purpose; and that the Library, Museum, Laboratory and House Committee be requested to consider and report on the best means of effecting that object."

He said it was over two years since he first proposed a resolution something to this effect, and since then he ventured to think the subject had not lost anything in importance. The Council of that day after considerable discussion recommended that the matter should be referred to a committee, and he should have thought it unnecessary to make any remarks now after the details he then gave, were it not for the fact that the Council had somewhat changed in constitution, some gentlemen having retired from it who were supporters of this measure; but still he had no doubt that those who had taken their places would be quite as strong advocates of it. The reason he brought it before the Council was that on receiving what was called the sixty-fourth annual announcement of the Philadelphia College of Pharmacy, he found that at that school there was a laboratory fitted up for teaching practical or operative pharmacy, with two hundred benches, which were all filled, and that in previous sessions they had had to refuse certain candidates for admission. Knowing perfectly well that American pharmacists were pharmacists, he felt that possibly the fact of there not being equivalent teaching in this country might somewhat account for pharmacists here not occupying so high a position. He wrote to Professor Maisch and Professor Remington, and received all the information he asked for, and desired to acknowledge their courtesy in the matter. They were most anxious to give any information they could as to the details of carrying out this work. He then looked up the history of this Society, and found that it had somewhat degenerated in this respect, for it appeared that in early days the Society had distinct professors of chemistry, botany, materia medica and pharmacy, and that the teaching of pharmacy then consisted in making some green extracts and other galenical preparations, and when he said that Professor Redwood was the professor of pharmacy, he need add nothing to show that the work was well done, so far

as it could be with the apparatus at his disposal. But the school had drifted out of this, and ceased to have a special department for teaching pharmacy until quite recently. During the last two years something had been done in this direction. He felt that now the school was teaching chemistry, botany, and materia medica, and neglecting the real object for which those branches of science were taught, viz., practical pharmacy. The object of teaching chemistry in that institution was not to make a man a chemist, and in teaching botany it was not to make him a botanist, but all these sciences were taught with the view of making him a pharmacist, and what was lacking was the application of the science taught. The reason he had altered the form of the motion was this: there were no real objections to the scheme, as he had proposed it, and it was ultimately delegated to a committee, but there were some criticisms upon it, and one gentleman said that the matter ought to be decided by the Council and not by the Committee. He had, therefore, now taken up that position, and asked the Council to accept the responsibility of deciding whether this thing should be done, merely delegating to the Committee the working out of the details. If the Society had a school worthy of the name it should teach the subjects which the candidates were examined in, and as they were examined in practical pharmacy he maintained that that subject ought to be taught. He knew that position had been objected to, and he had been told on the last occasion that the subjects he proposed were such as ought to be taught in the pharmacy itself. But they all knew that men might be fairly good chemists and botanists and well up in materia medica and yet very bad pharmacists, and some of the men examined there and turned out as qualified were wonderfully lacking in the application of the sciences they had learnt. He had seen men who had got very good marks in the examinations, but who were incapable of applying their knowledge. One of the most powerful arguments in favour of the curriculum was that the examination did not prove that the man was a good and thorough man. He would not make this a compulsory portion of the curriculum, because in all cases where pharmacists had laboratory arrangements, and were prepared to teach their apprentices practical pharmacy, he would not insist on their learning it in the school; but there were very few laboratories throughout the country where apprentices could be taught thoroughly, and those pharmacists who possessed them were just the men who did not take apprentices. The result was that this practical training was left very much to chance. When the Committee considered this matter he found no very great opposition to it, but there was one matter which was then discussed very much, and that was the question of convenience and cost. At that particular time the noble building which was now nearing completion had not been erected, and there were no means of fitting up a laboratory; the resolution came at a time when another proposal for research was being considered which had been carried through, and on which a considerable amount of money had been spent. He trusted the results would ultimately be equivalent to the expense incurred, and he had willingly withdrawn the motion for the time being at the request of the Committee, because it was rather feared that taking it up adversely to the question of research would perhaps strangle them both. To-day he was quite free from that difficulty; the question of research had been disposed of, and this was quite an independent motion. Research was not responsible for pharmaceutical teaching, nor was pharmaceutical teaching responsible for research; but there was a large building in which there was plenty of room well adapted for the purposes required. He had been told that several of the rooms in that building which were labelled "research," were not actually to be devoted to that purpose, but might be used for anything which might be necessary; but it was no particular part of his proposal to take any particular room. He hoped the Council would see its way to go into the matter not in a half hearted way, but to come to a unanimous vote in support of the proposal, for he could not see that anything like a weighty argument could be used against it. The cost of course would be something, but as he had pointed out it need not be a serious amount. He had had drawings sent to him by Professor Remington, representing the fittings of the School in Philadelphia, which were not very elaborate. In fact, a school could be fitted up for almost what was spent each year on the conversazione. He did not object to that expenditure, but, still, when something was said about cost before, he could not help feeling that when over £200 a year was spent on one evening's amusement, the question of expense ought not to be allowed to stand in the way of an important matter like this. He admitted that the Council could not go into the matter without some responsibility, but, on the other hand, it could not be rejected without more responsibility. Another objection might be that individually pharmacists had nothing to gain; that if they educated men in pharmacy they were simply educating them to do the work they were doing themselves; but he could not believe that any member of that Council would allow any personal considerations to stand in the way of discharging the public duty he had accepted to the commonwealth of pharmacy, and he trusted that an unanimous vote would be given in favour of the motion.

Mr. HAMPSON, in seconding the motion, said it appeared to him that Mr. Symes's arguments were absolutely invulnerable. It was customary in all other countries to have laboratories of this kind where practical pharmacy was taught, and the Society had been for some years singular in not having a chair and a laboratory for the purpose. Mr. Symes had referred to the fact that the school educated men in various subjects necessary for passing the examinations, but did not give them the final finish by showing them how to apply that knowledge. The position was something the same as if there were a number of persons brought together desirous of learning the fine art of cookery who were trained in the various properties of the articles they had to use, but were never asked to make a dish or apply their knowledge in the proper way. The time had now arrived when they should rectify this weakness in the institution. So long as the Council was unanimous in supporting a school of pharmacy it was its duty to make the school as perfect in all its departments as possible, and he was quite sure that while the school was without a laboratory for teaching practical pharmacy it would be extremely imperfect. He could not conceive what the arguments could be on the other side; it could not be on the score of expense, because the Council was already launching a scheme of education; nor for want of room, for if in the upper rooms accommodation could not be found the class could go into the basement. He hoped the motion would be carried to a practical and successful issue.

Mr. WOOLLEY asked if passing this motion would pledge the Council to go on with the scheme.

The PRESIDENT said it certainly pledged the Council to fit up some sort of laboratory.

Mr. ROBBINS: And to appoint a Professor.

The PRESIDENT said that was a detail which was left open. The chief difficulty in the matter was to decide how far to go.

Mr. WOOLLEY said Mr. Symes claimed it as an undisputed fact that there was plenty of room. But he thought the new building was put up for the purpose of a research laboratory, and an examination hall. There was no part of it at all fitted for the purpose Mr. Symes alluded to, unless it were the basement, which was very shallow and dark, and would be totally unfitted for evaporation. In fact he did not see where a practical laboratory was to be accommodated in the building. If the Council pledged itself to go on with the matter it would mean purchasing a piece of land elsewhere, and

the erection of a suitable laboratory. He had seen the one at Philadelphia which Mr. Symes had referred to. It was an institution framed on entirely different lines as regards the building. Instead of being in a prominent place it was in a somewhat retired part of Philadelphia, on back land which had been bought cheaply, where buildings had been put up very suitable for this purpose, and for lecture theatres. There was one for pharmacy, one for materia medica, and one for chemistry. So that the different professors did not clash at all. They had far more room, and could do their work much more economically than it could be done here. If they were to do the same they would also have to take some land of a cheaper character, and erect some suitable building.

Mr. NEWSHOLME thought by passing this motion the Council would not commit itself to anything very serious. If the resolution bound the Committee to carry out a certain thing, he should object to it at the present time, because it seemed to him the Council would have to spend a lot of money in fitting up the place, and buying materials, and the question was what was to become of the preparations which had been made ; they could not afford to throw them away, and they could not become a trading society.

Mr. BUTT remarked that no one would buy them.

Mr. NEWSHOLME thought it was too soon to go into that question.

Mr. ALLEN thought if the Council passed the motion as framed it would be bound to increase facilities for teaching practical pharmacy in the Society's school, and to fit up a laboratory for that purpose. When Mr. Symes brought forward the proposition before, while scarcely anyone round the table had any real objection to it, for it was what everyone wished to see done, at the same time certain technical and practical difficulties were seen at the outset, to which it was suggested that Mr. Symes should apply himself, taking time, and getting some particulars from America or elsewhere, and giving some suggestions as to what could be done in regard to the products, and so on. Mr. Symes had said nothing about that to-day, and therefore it seemed to him rather premature to decide on fitting up a laboratory, and though he should not like to appear to oppose the measure by any means, at the present moment he was not prepared to vote for it.

Mr. EVANS, speaking for himself and a large number of country chemists, said if there had been a laboratory of this sort when he was a student he should have been very glad to avail himself of it, and to men coming from the same quarter a laboratory of this sort was really of the greatest importance. It was now the time to go into the question of the research laboratory, but he certainly thought this was far more important to the people there represented. As the Council of the Society, which was an educational body, it was its duty to see that the younger members who came up should have every possible opportunity of acquiring information. He well remembered the time when he was a student in the Square ; he could go to the laboratory, and to the classes, but still there was something wanted, and he and others were obliged to supply themselves by paying privately either senior students or someone else to teach them, and many young men coming from the country were in great difficulty in this matter. Many of their masters had not facilities for teaching them what they would like ; they could not teach them elegant pharmacy. He did not know of any expenditure which would be more for the benefit of young members of the trade than a practical pharmaceutical laboratory, and he hoped the matter would be referred to the Committee, and a complete scheme be brought up hereafter.

Mr. BUTT said he had every sympathy with Mr. Symes, and if he could only see any chance of a feasible scheme he should be glad to see it carried out, but there were several objections. Mr. Symes said it was the duty of the Council to provide for the teaching of all the subjects examined in, and that an apprentice would not learn this, that, and the other. It seemed to him that if that were so apprenticeship ought to be given up altogether, and that the Society ought to take charge of the young men who wanted to go into the business, and teach them everything, Latin, French, how to read prescriptions, dispensing, materia medica, and practical pharmacy. Mr. Symes said it was very useful to know how to make green extracts. He had had some experience himself, and he knew there was a certain amount of trouble involved it, but he should like to know how one could teach a young man how to make green extract. He could not learn it unless he did it practically. Were there to be two hundred presses, and each man going through the whole process individually, or was it to be done in one big press? These were matters of detail on which the whole thing depended ; until it was known how it was to be carried out it was very difficult to say whether there should be a laboratory or not. Then the question was raised—what could be done with the products? If each man individually made an extract, which was the only way of learning how to do it, some would be good and some would be bad ; they could not be sold separately, and if they were all mixed together it would be a very heterogeneous mixture. He should like to know what fees were proposed to be charged, and a variety of other details, before he committed himself to the proposition.

The PRESIDENT remarked that the latter clause of the motion gave a good deal of latitude. If the Committee reported that there was not a suitable place in the building, the Council could accept the report or not. Mr. Symes proposed to send it to the Committee to do the best possible with the space at disposal. If the laboratory that could be provided in the new building or the old one were such as did not entirely satisfy Mr. Symes, he might prefer to wait a little longer, or he might say he would take the best he could. Of course the idea of two hundred students learning practical pharmacy all at once was rather alarming, but it was not necessary to anticipate that at first. He himself thought that facilities must be provided soon ; whether it would be done in the shape of a laboratory which would be satisfactory to Mr. Woolley with his wide experience was another matter. Mr. Symes might be content with using a room not quite so well adapted for the purpose as if there were more space at command, but he, the President, did think it was time to make a start.

Mr. WOOLLEY said he did not wish to throw cold water on the scheme ; he only failed to see where the accommodation was to come from. Some people were beginning to say the Society was ruined already, and he wanted to know how far the Council was to go in pledging itself to further expenditure of money. The idea commended itself to everybody, but the question was whether the Society had the means, and whether it had the rooms.

Mr. SAVAGE said this was a very important matter, but he did not think the Council had the materials for arriving at a conclusion. There were no data as to the probable expense, nor any estimate of what the cost of maintenance would be, or as to the fees likely to be derived from it as an extra study. He thought it would be better to refer the subject to a committee.

Mr. BOTTLE said he was desirous of supporting Mr. Symes in this matter, but he did not like to relegate the business to a committee pledged to construct a laboratory. He would rather it went as an open question, asking the Committee generally to report, not as to the best mode of making the laboratory, but as to the cost both of making and carrying it on. He would, therefore, ask Mr. Symes to accept a slight alteration which he should be willing to support, viz., that the motion should run in this form : "That the Council approves of increasing the facilities for teaching practical pharmacy in the Society's school, and requests the Library, Museum,

Laboratory and House Committee to consider and report on the best means of effecting that object."

Mr. HILLS said he was going to suggest some modification of that kind, and his suggestion would have been to omit the words—" by fitting up a suitable laboratory for that purpose." It seemed to him that this motion would commit the Council to do something which he was not prepared to do at present. He was not prepared to say that there was room, or that the Society had money for the purpose. The Council was pledged first of all to carry out a scheme of research, which was undervalued by some, but to which he attached very great importance in the future. If there were room, and if there were money for increasing the facilities for teaching practical pharmacy, he was afraid it might be necessary to do it. He regretted it, because he had always felt that pharmacy should be taught during apprenticeship behind the counter, but he was afraid there were great difficulties in young men learning what they were supposed to learn during their apprenticeship. He was not prepared to vote at the present moment absolutely in the terms of the motion.

Mr. ATKINS said he should give Mr. Symes his hearty support up to a certain point, but he was going to suggest that the motion be modified somewhat in the direction Mr. Bottle had indicated. The mode in which he suggested it should be altered was to alter the closing sentence, and that the Committee be requested to consider the practicability of effecting that object. Let the Council give a hearty assent to the principle as it had done two years ago. He happened to be in the chair when this discussion originated, and subsequently in committee he urged on Mr. Symes to make inquiries and inform the Council what was done in other schools with the products. It was felt that the Society could not be a trading body, and there might be waste incurred ; there were also other practical difficulties. One gentleman had said that the argument in favour of the motion was irrefutable, and whilst believing in the possibility of carrying on the research he thought the prosecution of pharmaceutical education was of even prior importance. Mr. Woolley seemed to have a strong opinion on the unfitness of the new building, and he could see that it might require steam power, and facilities for evaporation, and many other conveniences which would be necessary in a galenical laboratory. Whether the building was adapted to this purpose he could not say, but this ought to be thoroughly threshed out by the Committee before determining the question. If Mr. Symes could see his way to accept such a modification as he had suggested he should be very glad.

Mr. ROBBINS said when the subject came before the Committee before Mr. Symes was not able to bring forward any scheme, and therefore the Committee did not know what to consider, and if it were again referred to the Committee it would be found the first thing required would be for Mr. Symes to formulate some scheme. He did not know whether the intention was an ounce or two of extract should be made, or whether it should be made in fair quantity ; if they were going to distil sweet spirit of nitre simply as an experiment, or that it should be distilled in gallons. He thought it would be necessary to do it on a large scale to be of any educational value, but in that case the question would arise, How were the products to be disposed of ? He wished to know what the scheme was which Mr. Symes wished to introduce.

Mr. ALLEN asked if the subject was not still before the Committee.

The PRESIDENT said the consideration of it had been postponed.

Mr. EVANS asked to what expenditure was the Council limited ? what space was allotted to the research laboratory? and what amount would be spent upon it annually?

The PRESIDENT said a draft scheme had been before the Committee with regard to the amount of space required, but it was not yet definitely settled.

Mr. SOUTHALL said he should like to support the motion, but the Council certainly wanted a report from the Committee before it could go into some of the difficult questions which had been raised. A great many difficulties, however, which had been mentioned were certainly not difficulties at all. At the present time spirit of nitrous ether he presumed was distilled in the chemical laboratory, and probably what was distilled was thrown away, and he imagined chemists had often to teach their pupils certain processes, the results of which were thrown away.

Mr. CROSS said if he remembered rightly a motion very nearly the same as this, if not identical, was proposed two or three years ago. It was not fair to come down on Mr. Symes, and ask for a complete scheme all at once, and the Council was indebted to him for bringing forward the motion as it was. The details were left to be dealt with by the Committee. It was a sad admission to have to make, after the number of years the school had been in existence, that there was now a pressing necessity for an exclusively pharmaceutical laboratory, and it ought not to go forth that the few people who had laboratories did not take apprentices. There were some who had still not bowed the knee to Baal, old-fashioned people who had laboratories and did instruct their apprentices. What right had a man to take an apprentice at all if he did not teach him ? If dispensing was not in the hands of the chemist, and if he could not teach an apprentice pharmacy, what right had he to take one? It was very bad that after that Society had been educating chemists for so many years, when it ought to be looking forward to better things, to hear that it was necessary to begin *ab initio* as it were ; but the reason was that people did not now make their own preparations. He always felt humiliated when he heard persons get up and talk of pharmacy going out of the hands of the pharmacists altogether, but he could give practical instances where assistants had put down liq. strychniæ to be ordered from the wholesale house, saying they always ordered that, and the same with several other things. This being the state of affairs it was the duty of the Council to provide for the needs of the student, and he hoped it would not be delayed more than could be helped, but that in some form the motion would be carried unanimously.

The VICE-PRESIDENT asked if Mr. Symes was prepared to alter the motion, as Mr. Bottle suggested ?

Mr. SYMES said this proposal was not a hobby of his ; if it were he should feel all sorts of responsibility, and work at it night and day, and bring forward some elaborate arrangement which would carry out the object ; but he simply produced it because he thought it was the duty of the Council to do something of this sort. If the Council did not think it a duty to do so he should not press the subject farther. He hoped it would be decided that day whether practical pharmacy should be taught in the school or not, but if it were decided not to be desirable he should take no further interest in the matter. He had been asked why he did not come forward with further details, but the motion said that they should be left with the Committee. It was the same in every case. Then there was a discussion about establishing a research laboratory. Mr. Greenish said it was all very well to talk about a scheme, but it was a very difficult thing to get a practical scheme until it began to work. Whatever scheme he might draw out the chances were that it would have to be very considerably altered, and therefore it was far better to leave all the details to the Committee. In fact he had no intention of doing the Committee's work, although he would assist to the best of his power. On the last occasion the question was sent to a committee, and then postponed, because it was felt there were certain facts which it was desirable to be acquainted with, such as the disposal of the products, which he would not go into, though he thought there was no difficulty about it, and that no great loss was likely to accrue. It showed the uselessness of going into a great deal of detail about

such questions. Mr. Woolley said the building was not suitable, and he quite admitted it was not a building he should suggest should be put up for the purpose of teaching practical pharmacy; but there was a building there, and though a good deal of it was already appropriated, there was a large basement, which it struck him that morning would form a very fair and reasonable laboratory to commence with. There was no fear of having two hundred students, and indeed he should be very pleased to hear that there were twenty or thirty. He must ask leave to read what Mr. Bottle said on the previous occasion. He now wanted him first to go into committee, elaborate a scheme, and bring it before the Council; but on the last occasion Mr. Bottle said this was an important question which should be considered by the whole Council, and not remitted to committee, seeing it was introducing a new principle into the instruction given in that establishment; if the Council considered that it was desirable that pharmacy should form part and parcel of the instruction given there, it would be the duty of the Committee to suggest the best means of carrying it out. It seemed to him that was diametrically opposed to what Mr. Bottle had now suggested.

Mr. BOTTLE said Mr. Symes must have totally misunderstood him. The proposition he asked him to accept, and which he was prepared to move as an amendment if necessary was—

> "That this Council, desirous of increasing the facilities for teaching practical pharmacy, refer the matter to a committee."

He wished the Council to approve the principle before it went to the Committee to elaborate a scheme.

Mr. SYMES said he must apologise to Mr. Bottle for having misunderstood him. Mr. Hills, as he understood, said he was very much enamoured of the scheme of research, but he could not quite see his way to teaching practical pharmacy.

Mr. HILLS said he was not prepared at present to say whether the Society had the room or the money, but he thought it was something coming, although he regretted that it was necessary.

Mr. SYMES said that as he had misunderstood so many people, and as all seemed to agree with him, there was no necessity for him to say anything more.

The PRESIDENT suggested that if Mr. Symes would accept Mr. Atkin's suggestion he would probably get an unanimous vote. If the Committee came to the conclusion after deliberation that it was utterly impossible, the Council would not be surprised if the Committee sent up a report that it could not carry the scheme into effect.

Mr. SYMES said the motion would commit the Society to fitting up a laboratory of some sort. If it was the general feeling of the Council that it would be better not to commit itself absolutely to that position, the motion might be modified to that extent, but in drawing it he had been very guarded, and tried to draw a motion which would commit the Council to do something. If it was understood that the Council was going to alter the motion so that it might get a report, and was not committed to do something, he should stand or fall by the motion.

Mr. HAMPSON said Mr. Symes had mentioned this subject on several occasions, and there had been a sort of tacit understanding that space would be provided. More than once there had been a sort of promise, thought not in set terms, that a suitable place would be left for this purpose.

The PRESIDENT thought the chief difficulty would be in the fitting up, and as to the most suitable place.

Mr. WOOLLEY said his feeling was that he did not like to pledge himself that day to build a laboratory until he knew where it was to be, and what it would cost. He did not object to the principle at all.

Mr. ALLEN suggested that the motion should read "that this Council is desirous of increasing the facilities," etc., "and that the Committee be requested to report on the practicability of effecting that object."

Mr. SYMES said he rather objected to leave out anything. If the Committee reported that at present there were not sufficient means, but it was hoped there would be twelve months hence, it would be understood that whenever the Council could fit up such a laboratory it would do so. He was not seeking to carry a motion which would commit the Council to anything by a side-wind; the motion only approved of a principle which everyone said he approved of, viz., to carry out more thoroughly the teaching of practical pharmacy in the school, and that could not be done without fitting up some kind of laboratory. Having approved of that principle it was remitted to the Committee; the Committee might take some time to consider it; it might require to get estimates, and might report after all that at present to do it at all properly would take a larger sum than could be afforded, but that it might stand over for a year; still if the Council approved the principle, it would be committed to act upon it as soon as it was shown to be reasonable to do so. Looking carefully at the motion he thought the better plan would be to stand or fall by it as it stood, though he had no disposition to hasten it on unduly.

Mr. ATKINS said as far as he could gather Mr. Symes desired two things, first to affirm a principle, and by adopting the modification which either Mr. Bottle or himself had suggested, the principle would be affirmed. The next thing he should suppose Mr. Symes desired was to have an unanimous vote, to have an absolute consensus of opinion, and with such a modification he would get it; but if he pressed his original motion he would not. It would be a pity that there should be any division on this question, since all round the table there was an affirmation of the principle that practical pharmacy should be taught. The modification he suggested was not for the purpose of shunting it, but simply for the purpose of ascertaining the practicability of carrying it out.

The PRESIDENT said Mr. Symes had now consented to strike out the words "by fitting up a suitable laboratory for that purpose." He himself did not fear the awful responsibility of the original motion which seemed to press upon some members. There was no doubt that the Committee would approach the subject from Mr. Symes' point of view, and not with any prejudice against it; but of course he must not expect the work to be done off-hand. Those who had to do the work, especially those who had to initiate, had a good deal of work on their hands. The subject wanted consideration all round, and it might involve some re-arrangement of the old premises. In the report of the Visitor of the Privy Council on the examination of the past year, Dr. Greenhow said that he thought it was extremely desirable that the examination in pharmacy should be made one in practical pharmacy only; that he would like to see certain operations in practical pharmacy conducted by the candidates in front of the examiners. The Board of Examiners in London generally approved of that, and would probably later on send a communication to that effect. The question of practicability, of course, was an important one. Whether the Council liked it or not, increased facilities for teaching practical pharmacy must be found. It was a pity there were not enough men like Mr. Cross, who having laboratories and suitable premises, and having consciences also, took apprentices and trained them properly. The best teaching was that which the pupil got day by day in a combination of laboratory and shop, but as that could not now be obtained, the Council must do the best it could to supply the deficiency. Perhaps with this alteration the motion would be accepted unanimously.

The motion as amended was then put and unanimously agreed to in the following form:—

> "That this Council approves of increasing the facili-

ties for teaching practical pharmacy in the Society's School; and that the Library, Museum, Laboratory and House Committee be requested to consider and report on the best means of effecting that object."

The Pharmacy Bill.

The President reported, that as had been stated in the Journal, the Pharmacy Act Amendment Bill had to be withdrawn late in August in consequence of the pressure of business. In due time the matter would come on for consideration as to the form in which the Bill should be presented to Parliament in a future session.

General Purposes Committee.

The report of this Committee included the usual letter from the Solicitor, stating the progress of cases which had been placed in his hands.

Charles Durant, 37, Bargate, Boston,

had paid into court the amount of penalty and costs.

Other cases of alleged infringement of the Pharmacy Acts had been considered by the Committee, and two were recommended to be placed in the hands of the Solicitor.

The Committee had considered the memorial from the Dover Chemists' Association, and the President had been requested to send an answer to the same.

The President moved the adoption of the report and recommendation, which was unanimously adopted.

The Sheffield School of Pharmacy.

Mr. Newsholme, referring to the inaugural meeting of this school on Wednesday next, when the President had promised to attend and present the prizes, said he was desired by Mr. Furness, the local president, to invite any other member of the Council or of the Society to attend and encourage the effort which was being made. Anyone connected with pharmacy would be heartily welcome.

EVENING MEETING.

Wednesday, October 5, 1887.

The first Evening Meeting of the session was held on Wednesday, October 5, the chair being taken at half-past eight o'clock by Mr. Michael Carteighe, President of the Society. The lecture theatre was crowded to excess.

The President first called upon Professor Bentley to present his Report on the Botany and Materia Medica Class; and in doing so asked him not to take leave of them, because he would still be associated with the Society he hoped for many years as Emeritus Professor of the science which he had taught so long and so well. He hoped, therefore, he would not say *adieu*, but simply *au revoir*.

Report on the Botany and Materia Medica Class.

Professor Bentley said this was the thirty-ninth time it had been his privilege to appear on such an occasion. It had always been a pleasurable duty to him, and he need hardly say that it was so now. He could not but remember that this was the last time on which he should appear in that particular capacity; still, though it was difficult to do so, he would endeavour as far as possible to take the President's advice, and rest on the present and the past, rather than refer to the future. He would only say a few words, therefore, but as it was the last time he should say them in the position which he had held for so many years, he knew they would be received as they always had been. He had always had a pleasure in appearing on these occasions, because he had always had to speak of the extreme diligence, good conduct, and progress of the students in the School of Pharmacy. He must repeat these words for the last time, and he believed it would be something like a volcano or an earthquake which would destroy the character of the students of the School of Pharmacy. Some persons thought they could predict when earthquakes were coming; he did not pretend to do that, but he was quite sure that anyone who was familiar with the students of that School, if he predicted at all, might safely prophecy that as their conduct had been in the past so would it be in the future. As to the successful competitors, there was no doubt that all these gentlemen thoroughly deserved the honours which had been conferred upon them.

Their names were :—

[Five months' course.]

Bronze Medal .....Charles Russell Andrews.
Certificate of Merit .....William Mortlock Palmer.

[Ten months' course.]

Silver Medal ....Edmund White.
Certificates of Honour .....John Thomas. Weston Poole. Edward James Woolley.
Certificates of Merit .....Arthur Richard Cross. Charles William Andrew. David Reid.

For the questions set at these examinations, see *ante*, p. 122.

Report on the Class of Practical Chemistry.

Professor Attfield, in presenting his report on the results of the examination for Council Prizes in the Practical Chemical Class, having read the names of the prize winners, stated that out of a possible maximum of 100 marks the gentleman who came first had obtained 93, and the next two 89 and 86 respectively. The conduct, attention, and diligence of the students throughout had been most satisfactory. The names of the successful competitors were—

Silver Medal .....Edmund White.
Bronze Medals .....Edward Young. David Reid.
Certificates of Honour .....Edward James Woolley. Charles William Andrew.
Certificates of Merit .....Weston Poole. George Averill. Alfred Edward Chaston.

For the questions set at this examination, see *ante* p. 124.

Report on the Class of Chemistry and Chemical Physics.

Professor Dunstan, in reporting the results of the examination in the Chemistry Class, drew attention to the fact that he had to mention almost the same names as those read by Professor Bentley. It showed the men must have worked very diligently during the session in order to distinguish themselves in two distinct subjects.

The successful competitors were—

[Five months' course.]

Certificates of Merit ..... (Equal.) Thomas Alfred Beadle. Alfred Edward Chaston Wm. Mortlock Palmer.

[Ten months' course.]

Silver Medal .....Edmund White.
Certificates of Honour .....John Thomas. Edward James Woolley. Weston Poole.

For the questions set at these examinations, see *ante*, p. 123.

The PRESIDENT, with a few appropriate words, then presented the prizes and certificates to such of the competitors as were present.

THE HERBARIUM PRIZE.

Professor BENTLEY was next called upon to report on the competition for the Herbarium Prize. He said he looked upon these prizes as one of the great features of the Society. Whatever ideas might be entertained on the subject of botany, the subject of practical botany would never be forgotten by that Society. The connections between practical and systematic botany and materia medica were so close and important, that although in the past perhaps the subject of systematic botany had been too much to the fore, it would never cease to have that place which was essential to it. The foundation for a practical knowledge of botany in young students was the collection of plants. On this occasion, although there were not many competitors, there were two collections which were very satisfactory. The Silver Medal had been awarded on his recommendation for a collection of no less than 630 specimens carefully collected, dried, and, on the whole, very well named. The Bronze Medal had been awarded for a collection of 330 specimens, which also was well worthy of the honour. He was sure that the gentlemen who had sent in these herbaria, having early studied practical botany to so good a purpose, would come forward hereafter and show themselves amongst the most distinguished students of the School.

The successful competitors were :—

Silver Medal .....Charles Bond Smith.
Bronze Medal .....Henry Garnett.

THE COUNCIL EXAMINATION PRIZES.

The PRESIDENT, having presented these medals, gave a *résumé* of the report on the Council prizes. These prizes, he said, were designed for the encouragement of proficiency in botany, materia medica, and chemistry, throughout the whole kingdom. They were only open to those who had passed the Major examination, and therefore a very high order of merit was expected. In the present case the examiners reported that out of a total of 1000 marks, the best candidate obtained no less than 766 ; and he could vouch from a knowledge of the papers that this was a very high standard, having regard to the quality of the questions. All who had had any experience in these matters, knew that very much in a competitive examination depended on the stiffness of the questions and the way in which the marks were allotted. The examiners for these prizes were not, as a rule, he believed, very liberal to the competitors, and, therefore, when a candidate obtained 766 marks out of 1000, it represented a very high standard of knowledge. The first prize, which had been gained by Mr. John Thomas, was named the Pereira Medal, and was the highest honour which could be conferred on any member of the craft. A silver medal, called the first Council Medal, was awarded to the second candidate, who had gained 692 marks, and he was glad to say that this competitor was Miss Margaret Elizabeth Buchanan. They had seen from time to time how anxious ladies were to show what good stuff there was in them, and though some thought this was unnecessary, when they found one lady almost winning the Pereira Medal, and another one getting the first class in classics at Cambridge, they might well bow their heads in submission to the strength of mind of what was called the weaker sex. He could assure the ladies present that he was right glad that Miss Buchanan had been successful. He had watched the career of sundry lady students in that establishment with peculiar interest, and one of the advantages possessed by the President of the Society was that he could, in the examination room and elsewhere, make himself acquainted with the merits of the different candidates more freely perhaps than an ordinary member of the examining Board could do. He was thus able to confirm the judgment of the two examiners in regard to this lady, of whom they knew nothing except her motto ; but he could speak of the steady substantial work which Miss Buchanan had done in that school. The third candidate, who received the bronze Council Medal, had obtained 669 marks. The award of the examiners was as follows :—

PEREIRA MEDAL (SILVER); and Books value £5, presented by Mr. T. H. Hills.

John Thomas.

PHARMACEUTICAL SOCIETY'S MEDAL (SILVER) ; and Books value £3, presented by Mr. T. H. Hills.

Margaret Elizabeth Buchanan.

PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE) ; and Books value £2, presented by Mr. T. H. Hills.

Charles Boulter Gilson.

For the questions set at these examinations, see *ante*, p. 122.

The PRESIDENT then presented the prizes, and in so doing gave a short sketch of the history of the Pereira Medal.

THE JACOB BELL MEMORIAL SCHOLARSHIP.

Mr. BOWEN was next called upon to report on the examination for these Scholarships, which had been conducted by Mr. Blunt and himself. He was sorry to say there had been a little falling off in the number of candidates, as this year there were only twenty-three as against thirty the year before, and thirty-two the year previous to that. The quality of the candidates, however, was very satisfactory, as no less than eight, or more than one-third, obtained sufficient marks to qualify them for the prize. They had only to listen to the reiterated praises of Mr. E. White that evening to see what Bell Scholars could do ; they always came to the front at the annual examinations, and they might look forward to these two gentlemen upholding the reputation which their predecessors had won. The successful candidates for the Jacob Bell Memorial Scholarships were :—

William Appleton Salter, of Birkenhead,
and
Alfred Mander, of Leamington.

The PRESIDENT then presented the remaining prizes.

THE INAUGURAL ADDRESS.

An Inaugural Address was delivered by Sir D. DUCKWORTH. It is printed at p. 297.

At the conclusion of the address—

Dr. GREENHOW said : Your predecessors in that chair, Sir, have on several occasions invited me to propose the vote of thanks to the gentleman who has given the opening address at the commencement of the winter session of this Society, and although, strictly speaking, an outsider, I have felt that my official

position as visitor on behalf of the Privy Council of the examinations held by your Board of Examiners, probably justified me in accepting the honourable office. I did not, however, expect that on the present occasion, when the annual address was delivered by a physician, you would have asked me to undertake the duty. I nevertheless very heartily respond to your call, and have very great pleasure in proposing the thanks of this large meeting to Sir Dyce Duckworth for his very admirable address. It is perhaps the best and most suitable address that I have heard in this room; full of suggestion, not only for the students, but for all who take any real interest in the subject of pharmaceutical education. For my own part I may say that I agreed with every word that was said, and am pleased to find that without any previous communication with me Sir Dyce Duckworth has arrived at such almost identical views respecting the position and education of pharmacists. To the members of the Council and of the Board of Examiners of this Society it must have been as gratifying as it was to myself to hear him say how greatly the skill and knowledge of pharmacists have improved since the requirement of a certificate before commencing business. I have been able, as many present know, to express my opinion year after year that all those who pass the examinations of the Pharmaceutical Society are fully qualified to carry on the business of a chemist and druggist, and I consider this independent testimony to the like effect very encouraging and gratifying. Many of you are aware how frequently I have ventured to express a hope that in due time the dispensing of medicines would fall almost entirely into the hands of pharmacists, for it will be long before it can be possible for each country village to be supplied with resident pharmacists, and I am glad to observe that Sir Dyce Duckworth holds the same view, and entertains the same wish. I, however, go somewhat further, and am glad to take this opportunity of saying so. Speaking as an individual, and not in an official capacity, in which indeed I have no right to express any opinion here on such a subject, I am strongly of the opinion that both in the interest of the public, and I may add, in that of pharmacists, who are now compelled by law to obtain a certificate of competency before commencing business, it would only be right that no one who does not hold this certificate should be allowed to retail officinal medicines. I would not, indeed, prevent grocers and stores from selling such simple medicines as castor oil, salts and senna, and the like, but I would restrict the right of selling every compound medicine ordered to be prepared after a certain manner in the Pharmacopœia to legally qualified pharmacists. With regard to the higher knowledge of chemistry as a science, which you have been advised to aim at attaining, I have always looked upon the Major qualification of the Pharmaceutical Society as being capable of being raised much higher than it is at present. It is true that many persons holding it are in every sense of the word scientific chemists, but I could wish to see all who pass this examination so highly educated as to be qualified for those higher duties referred to in the address, such for example as those of public analysts and chemical experts. I am also very glad that Sir Dyce Duckworth has spoken so plainly on the subject of the prevailing habit of employing and selling proprietary medicines. Their use is prejudicial alike to the pharmacist, the physician, and what is much more important, to the patient. In conclusion it only remains for me to move the cordial thanks of this assembly to Sir Dyce Duckworth for his eloquent, thoughtful, and able address. It is not only worthy of your careful consideration, but deserves the careful consideration of the members of my own profession, and might very properly be noticed in the medical journals as touching upon several subjects closely affecting our interests, and the success of our art.

The motion having been seconded and put to the meeting was carried by acclamation.

Sir Dyce Duckworth, in response, tendered his heartfelt thanks for the kind way in which his remarks had been received. As he had already said, he had thought a good deal about the subject, and what he had said was the result of many years' consideration. When asked to give the address he felt very pleased to have the opportunity of firing off, as it were, what had been coming to a head in his mind for a long time, and if anything he had said led to better ways in any degree, or to any improvement which should conduce to the honour of the Society and of pharmacy, or to the purification of his own profession, he should be only too proud.

Presentation of the Hanbury Medal.

The President said the next business was to present the Hanbury Medal. He had now been so long in harness that he feared he could say nothing new in regard to it, and possibly some of his hearers might accuse him of want of knowledge of his own language if he repeated a portion of the same preliminary statement which he had already made on two previous occasions, when it had been his privilege to present this medal on behalf of the trustees, the Council of the Society. The judges on whom rested the responsibility of making the award were the Presidents of the Chemical, the Linnean, and the Pharmaceutical Societies, and of the British Pharmaceutical Conference, and one pharmaceutical chemist nominated by the Presidents of the Pharmaceutical Society and of the Conference. On the present occasion these gentlemen had selected Dr. Inglis Clark, who was good enough to assist, being a pharmaceutical chemist, in making the award, and after careful deliberation the medal had been awarded to Brigade-Surgeon Dymock, of Bombay. The life of the late Daniel Hanbury was devoted to the elucidation of the natural history and chemistry of drugs, and he literally sacrificed almost every pleasure of life to that object. To many young students it would be a revelation to be told that a man who had the education of a gentleman, and every comfort which social position and sufficient means could give, should abstract himself from the world, and devote the whole of his leisure to ascertaining the natural history of drugs which might be or were useful in the cure of disease, thus prolonging human life and tending to the advancement of science. Many probably were not aware how eminent he became in the pharmacological world through his unwearied pursuit of this object. At the time of his lamented death, and in fact long before, he was the greatest living authority on drugs, indeed, since the death of Dr. Pereira, there was no higher authority in the whole world. When so distinguished and self-sacrificing a man was taken away, it was only natural that some of those who were

not so distinguished, but who participated by reflection in the glory which he had shed on the pharmaceutical calling, should be anxious to perpetuate his name in a way which, so far as they could judge, would have been most grateful to his feelings, and so it came to pass that a sum of money was raised, and it was determined to award every two years a gold medal, to be called the Daniel Hanbury Medal. It was decided that it should be awarded, not by examination, but at the discretion of the five gentlemen he had named, who should select the person in any country who should at that particular time have done the best work in the natural history and chemistry of drugs. It had been his privilege to be associated for some years with Mr. Hanbury, but it was somewhat strange that he should have for the third time to recall the excellence of his friend's character and his devotion to materia medica. The award this year had been made to Brigade-Surgeon Dymock, and he would not weary the meeting by narrating that gentleman's services; he would simply mention the fact that he had done just the sort of work which Hanbury, if he had been living, would have delighted in. Being placed in India he had taken the native drugs of that great peninsula, examined them, gone into their natural history, and to some extent into their chemistry, identified them, and sent home specimens of everything which he had examined. He had done for native Indian drugs what Hanbury had for the Chinese materia medica, and it was felt by the adjudicators that this work, apart from any other, was one of the very highest order. In the absence of Professor Dymock, who was fulfilling his duties in Bombay, the Government of India had asked Brigade-Surgeon Hooper to attend and receive this medal for transmission to Professor Dymock, and all present would desire to convey, through him, their congratulations to the recipient. They might also congratulate the Government of India on the fact that it had in its service so efficient and able an officer. He had now the privilege of handing to Brigade-Surgeon Hooper, together with the gold medal, two copies of Daniel Hanbury's works, which Mr. Thomas Hanbury, his brother, wished to accompany it.

Brigade Surgeon HOOPER said it was with feelings of extreme satisfaction that he received on behalf of Brigade-Surgeon Dymock this gold medal, and begged to express his high sense of the honoured distinction thus accorded to him. Brigade-Surgeon Dymock had not only obtained this honour for himself, but he reflected it on the whole service to which he had the honour to belong, the Indian Medical Service, by whom it would be highly prized as an addition to the laurels that service had already won, and it would be a further incentive to the efforts of others, who, like Brigade-Surgeon Dymock, were at work in the vast field of research which India afforded.

BOOKS RECEIVED.

QUALITATIVE CHEMICAL ANALYSIS. By Dr. C. REMIGIUS FRESENIUS. Tenth Edition. Translated from the Fifteenth German Edition by CHARLES E. GROVES, F.R.S. London: J. and A. Churchill. 1887. From the Publishers.

EXERCISES IN QUANTITATIVE CHEMICAL ANALYSIS: with a Short Treatise on Gas Analysis. By W. DITTMAR, LL.D. (Edin.), F.R.S., etc. Glasgow: W. Hope. 1887. From the Publisher.

BENCH BOOK FOR TEST-TUBE WORK IN CHEMISTRY. By H. T. LILLEY, M.A. London: Hamilton, Adams and Co. 1887.

THE COMMONER DISEASES AND ACCIDENTS TO LIFE AND LIMB. By M. M. BASIL, M.A., M.B., etc. London: J. and A. Churchill. 1887. From the Publishers.

MANUAL OF HYPODERMIC MEDICATION. By Drs. BOURNEVILLE and BRIEON. Translated from the Second Edition, with Additions, by A. S. CURRIE, M.D. Edin. London: H. K. Lewis. 1887. From the Publisher.

A TREATISE ON THE ANIMAL ALKALOIDS. By A. M. BROWN, M.D. London: Baillière, Tindall and Cox. 1887.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

OLEATE OF ATROPINE IN SUPPOSITORIES.

Sir,—Permit me to suggest that a small advance might be made towards exact and efficient pharmacy if prescribers would direct the use of oleate of atropine in suppositories instead of extract of belladonna. The extreme difficulty of diffusing the latter through the melted theobroma has long been recognized, and the substitution of the alcoholic extract of the root proposed as a remedy. At the best it only palliates the evil, and is open to the grave objection that root extract differs from the green in alkaloidal strength. Messrs. Dunstan and Ransom have shown that in the leaf extract this approaches 2 per cent.

Ten grains, therefore, of atropine dissolved in half an ounce of oleic acid, and diluted with oil to a fluid ounce and twenty minims, would form a solution of which one minim would be equivalent to one grain of extract.

I find that solution takes place readily even in the cold, and that suppositories made by adding 1 minim to 15 grains of melted cocoa butter are unexceptionable in appearance and finish.

Obviously, the proportion can be varied as required, and uniformity of strength ensured by the exercise of ordinary care.

It seems reasonable to assume that such would be more readily absorbed, and produce the required physiological effect with rapidity and certainty.

Market Square, Dover. J. F. BROWN.

THE PRESERVING OF DAMSONS.

Sir,—It may be worth while at this time of year to call attention to a simple and easy way of keeping damsons from season to season.

Into a clean and dry 40-ounce stoppered wide-mouthed bottle pour half a drachm of chloroform, then pack in a pound and a half of the sound fruit, and introduce the stopper, slightly vaselined. It is desirable to tie in the stopper with twine, as it is sometimes blown out during warm weather. For a week or two the fruit retains its natural appearance, then drops begin to exude from the surface, which gradually collect into a perfectly clear, richly-coloured liquid, partially filling the bottle; the fruit at the same time shrinks a little. In this condition it may be preserved without further change for at least a year, and probably for much longer periods. When eaten raw the damsons have a slight, but by no means disagreeable, flavour of chloroform, and would be a pleasant addition to the dessert table, to be partaken of sparingly, like brandied cherries; on cooking, the chloroform entirely disappears, and the flavour is that of the fresh fruit. The quantities given above are those which have yielded a successful result, and I do not think that a less proportion of chloroform would suffice to keep the fruit. The quantity in each vessel might of course be determined by convenience, and is only limited by the difficulty of getting large bottles with perfectly fitting stoppers.

The experiment was of course suggested by the well-known inhibitive action of chloroform on the functions of microbes, and several other plans were tried, such as the

use of chloroform water in which to keep the plums, and of corked vessels, vaselined over, where the chloroform alone was used; success, however, was only met with under the above given conditions, though no doubt others might be devised which would have the requisite effect of keeping in the chloroform vapour, and thus paralysing the yeast cells and septic organisms. Probably other fruits and provisions might be preserved in the same way, though in the case of animal food the solvent action of the chloroform upon fats might interfere. The great advantage of chloroform over salicylic acid and other fixed antiseptics is that it is got rid of in the act of cooking, and therefore, unlike them, leaves the food in a natural state for digestion.

THOMAS P. BLUNT.

EIGHTEENTH CENTURY REMEDIES.

Sir,—An interesting article in a recent issue of the *Pharmaceutical Journal* on "Pharmacy in the Seventeenth Century," by Mr. C. J. S. Thompson, and the subsequent publication of a very remarkable order for drugs, contributed by Mr. Taylor, reminded me that among my archæological treasures I had a venerable family receipt book, of ample proportions and ancient appearance, an extract from whose miscellaneous contents would probably interest my brother-pharmacists. It is a volume I should like to have the opportunity of showing them; with a strong parchment binding that bravely resists the united attacks of time, exposure and general rough usage. An inscription on the inner side of the cover proclaims that it was given by one of my illustrious ancestors to her niece in the year 1778, and as the receipts had been slowly collected for some time before that date, we shall not be far wrong in ascribing the tome to the middle of the eighteenth century. It is, of course, essentially a cookery-book, but the compiler, like the dear good housewife that she undoubtedly was, never turning a deaf ear to the cry of human suffering, evidently sought and entered in her book, not only the very best methods of concocting delicious nightcaps, perfecting toothsome delicacies for visitors, and setting the fickle seasons at defiance by preserving, pickling, salting, curing and bottling, but well-authenticated recipes for the alleviation of all physical complaints to which, as far as she knew, flesh was heir. And it is this heterogeneous character that gives an additional charm to the old tome, this blending, in utter disregard of what I may be allowed to call "the unities," of receipts and formulæ, culinary, medicinal and domestic. Thus on one opening of the book we find how "To Scour Pewter," "To dye 3 pair of stockings pink couler" (how oft have I wondered whether the receipt would answer for four pair), "To make Yellow Blomange," "For a weak child the plaster," and "To pickle 2 Hams Mrs. Fletcher's way"; while opening at another place we find prescriptions "For a thick Throat," "For an Eruption, Ringworm or Itch," "For a Swelled face," "To dye yellow on Cotton," "Ointment for a Scald or Burn," and "To clarify Treacle." However, as space is valuable in the *Pharmaceutical Journal*, I must judiciously cull a few only of the most curious examples of remedial agencies, so as to obtain some idea of the way in which our ancestors "doctored" themselves a hundred and fifty years ago.

It is a maxim that all great inventions are simple; that success in the treatment of disease is gained not by the empirical trick of employing a number of remedies in one complaint, in the hope that one or other will be of avail, but in using the right agent in the right case. This consideration ought to strengthen our faith in—

"Mr. Snellson's Receipt for a Cancer.

"Take nettles sufficient to cover the breast, and pound them in a mortar, then lay them fresh on twice a day.

"Every third morning take also a large spoonful of the nettle Juice internally.

"This simple remedy has of late been of great service in several cancerous disorders in Lancashire."

Again we find simplicity and efficacy combined in the following—

"Receipt for the Rheumatism.

"Three-quarter oz. of Senna, ¾ oz. Juniper Berries, ¼ oz. Hartshorn shavings, 2 oz. sassafras chips, 1 dr. orrace root.

"Bruise all together, and boil them in two quarts of water till it comes to one, then strain it off and sweeten it with brown sugar. Take a large teacupful, morning and evening. It is gently opening and has done great cures."

For the following prescription we seem to have no modern equivalent, though innumerable substitutes:—

"For Bilious Complaints.

"To ease pain in the stomach, take a spoonful of lemon juice, saturated with salt of wormwood. And to carry it off, take a Scotch pill over night, and half a dram of vitriolic Tartar [sulphate of potassium ?] with ten grains of rhubarb the next morning."

For the very strange line of treatment recommended in the following I can imagine no satisfactory explanation.

"For the Ague.

"Take a bit of alum the size of a pea, in sage tea, when the fit is coming on, increasing one each time to 9.

"If that does not cure, then diminish one each time, etc."

This is probably what would be called "letting him down gently." Here is one which, to say the least, leaves room for the exercise of faith on the patient's part:—

"For the Worms.

"Take a small handful of each, Rue, Wormwood, Savin, and Hoar-lavender: bruise them and boil them up in ½ a lb. of fresh butter. Anoint the pit of the stomach every morning fasting before a fire."

Perseverance would probably be an essential in this course of treatment. Perhaps a more unexpected ingredient of an ointment than the following would be difficult to find:—

"For the Piles.

"Snuffs of Mould Candles, and ointment of Marshmallows, melted and well mixed, and anoint the part with a feather."

"Fiat Experimentum"—the proverb is somewhat musty! But there is certainly method in the madness of the next prescription; a seeming determination on the part of the prescriber either that he shall conquer the malady, or that the patient shall perish in the attempt:—

"To stop a Purging.

"Pipeclay powdered and sifted, take as much as will lie on a shilling mixed in a spoonful of red wine every hour," though he humanely adds—

"Increasing the interval of taking as the disorder abates."

In conclusion let me give an extract, which, if true, ought to be widely known, as the adoption of the advice given would in that case be the means of alleviating unnumbered cases of direst suffering:—

"To facilitate difficult Labors.

"Take of laurel leaves dried (not too old, but gathered within the year), and powder them well; taking care that no mixture or dirt be among them. Take two spoonfuls of this powder and mix it with oil of olives, of such a consistency as not to run about; spread it on a linen cloth and apply it to the navel of the woman in labor. In whatever irregular position the birth may be it will immediately turn, and present itself in the most happy manner." The author says, "I have seen 1 in labor for 7 days, and 4 more who were for 8 days, and by application of the above three of them were immediately relieved, and happily delivered. Note, the berries may be used instead of the leaves. Such a Remedy is worthy of esteem." Which nobody can deny.

72, *Aubert Park, Highbury, N.* W. H. VERNON, M.P.S.

Mr. Richards is thanked for his communication.

Indigator.—The formula seems to be a modification of one given in the 'Physicians' Pharmacopœia.' We have heard that it has yielded successful results in other quarters, but would advise you to try a slight increase in the quantity of tragacanth.

Chem.—Apply to the Secretary to the Chemical Society, Burlington House.

H. Carter.—Bentham's 'Handbook of the British Flora,' illustrated edition.

T. Milton.—There is an Extractum ferri pomatum in the Pharmacopœa Germanica, but not a Liquor.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tichborne, Kay Bros., Heron, Crow, Bennett, Milton, Bell, Agaricus, Ph. Ch., Innocent Chemist.

1887. TWENTY-FIRST SEASON.

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(REGISTERED).

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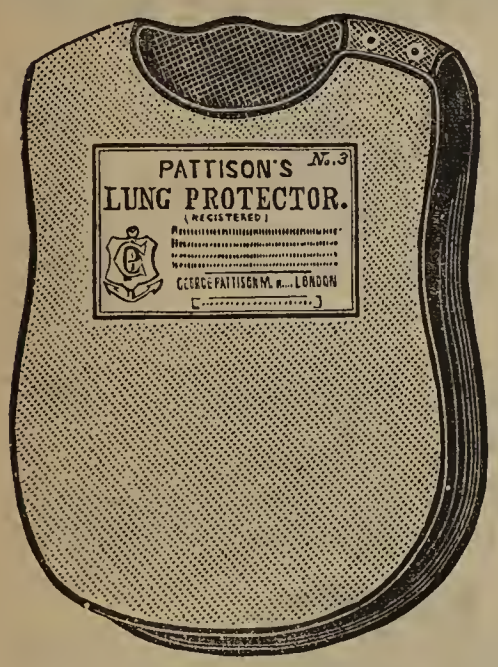

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Lung Protector.
THE AMERICAN

Lung Protector.
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ORIGINAL PATTERN, Eight sizes ...	14/-	18/-	26/-	34/-	42/-	52/-	60/-	70/-	per doz.
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FELT CHEST PROTECTORS.

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Nine sizes	4/-	6/-	8/-	10/-	12/-	16/-	20/-	24/-	28/-	per doz.

All in Scarlet and White, and made in same Wool as the "Lung Protector."

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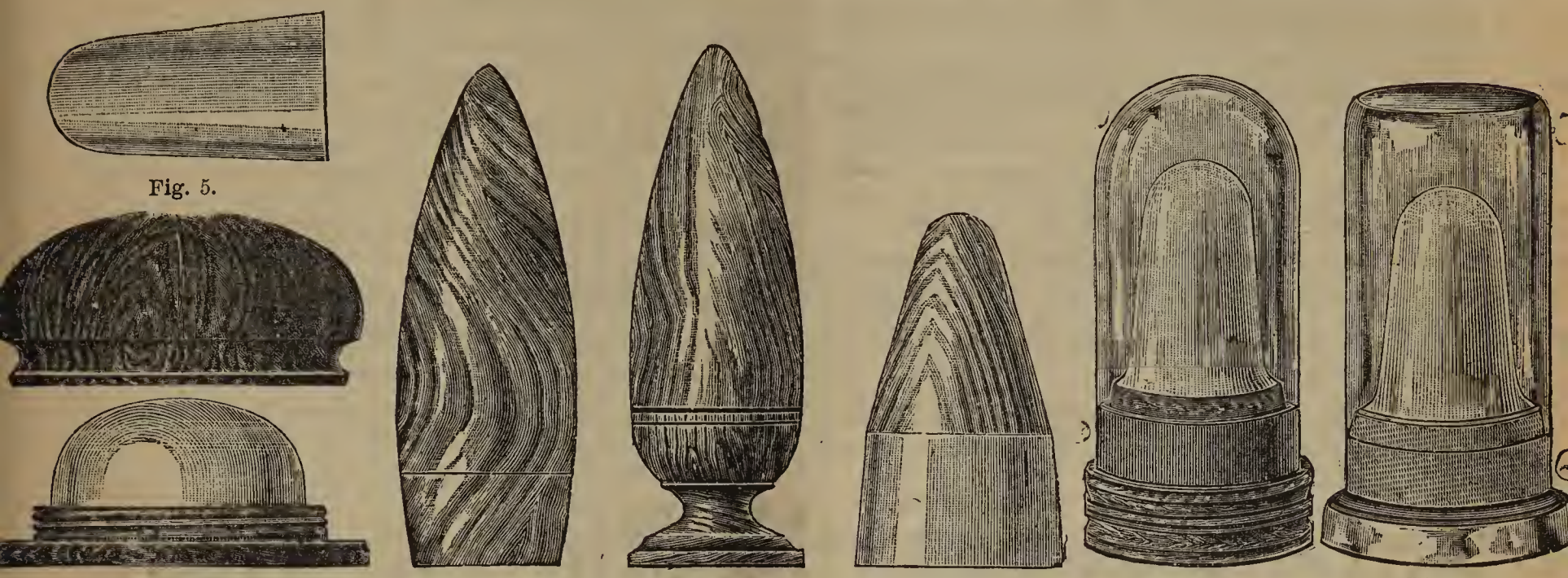

Fig. 1. Fig. 3. Fig. 4. Fig. 6. Fig. 7. Fig. 8.

Fig. 1.	In Ebony Cases, flat for the pocket	per doz.	6/-
	In Boxwood Cases, per doz., 3/- and 4/-; in Vegetable Ivory	,,	6/-
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Fig. 5.	In White Opaque Glass Jars, with Red Celluloid Caps	,,	2/6 and 3/6
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Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps	,,	4/6
Fig. 7.	On Boxwood Mounts, Glass Covers	,,	3/3 and 5/9
Fig. 8.	On Glass Mounts with Glass Covers	,,	4/6 and 6/-

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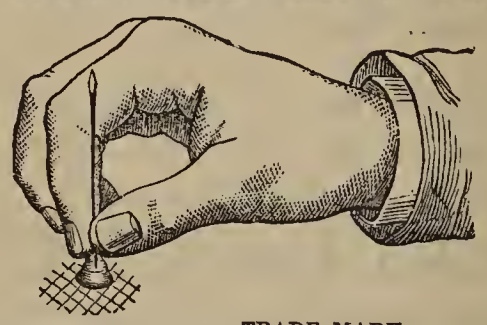

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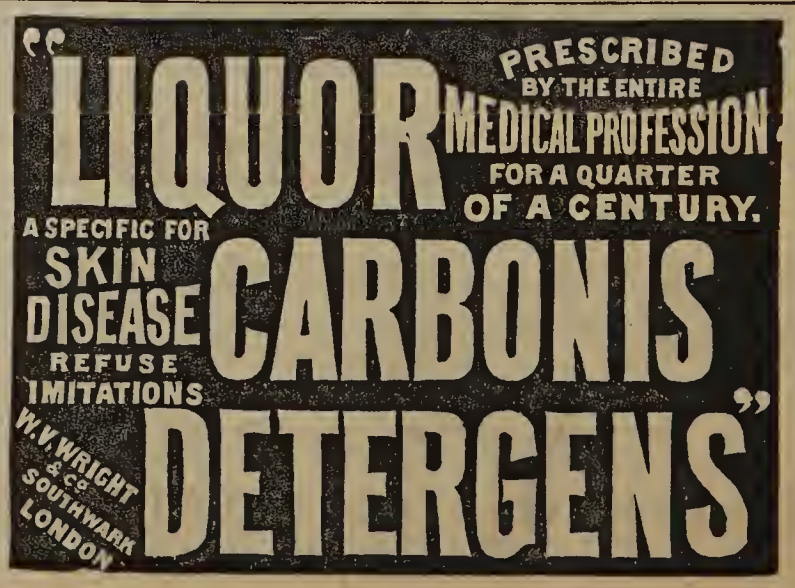

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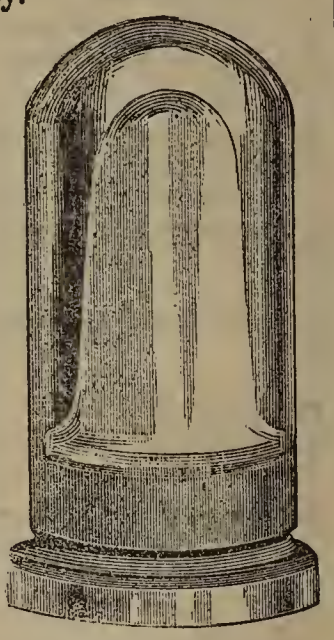

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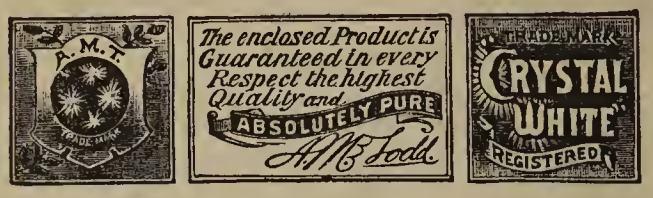

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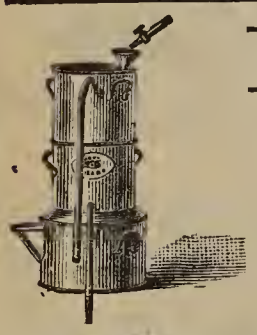

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CHANNEL ISLANDS.—An old-established (1826) Retail and Prescribing BUSINESS, with valuable proprietary articles. Capable of addition as Dentistry or Stationery, and well worthy of attention. £400 on valuation. Rent £40. M. J. G., care of Maw, Son & Thompson, Aldersgate St., London, E.C.

KENT.—Prescribing and Retail Chemist's BUSINESS. Old-established. Rare chance for a good position in main fashionable thoroughfare, with excellent surroundings, and good scope. Price £650. Rent £110. Good nine-roomed house. Has been in same hands many years. Apply, A. Z., 20, Mount Pleasant, Tunbridge Wells.

IN the main thoroughfare of a populous London suburb, an old-established Prescribing, Dispensing, and light Retail Family BUSINESS for disposal. Returns over £500 a year, with large profits, the owner retiring from business. Cash price £350. Address, DRUGGIST, 2, The Cedars, Putney, S.W.

BUSINESSES FOR DISPOSAL.

OLD established Retail and Dispensing BUSINESS. Main thoroughfare, in thickly populated neighbourhood. Well fitted shop. Been much neglected. Returns could be trebled in a few months. Trams and buses pass door. Close to railway station. Low rental. Healthy part. About £350. No agents. Apply, in first instance by letter, W. N., Chemist, 9, Goldhawk Rd., Shepherd's Bush.

IMMEDIATELY.—Owner is going abroad. Small but profitable Retail and Dispensing BUSINESS in main road. Established 1802. Capable of great extension. Convenient house, at £50 rental. Solid mahogany fixtures. Populous neighbourhood. Returns last year £425. Price £350, or offer. CHEMIST, Ferndale, 37, Upham Park Rd., Chiswick.

£330. WELL-fitted and stocked cash Retail and Prescribing BUSINESS, S.E., main road. Return over £430. Rent on lease £50, house part let off. Open to investigation or trial. Letters only for address. X. Y. Z., care of Messrs. Langton & Co., Wholesale Druggist, Thames St.

HOME COUNTY.—(50 miles of London). Good class Retail and Dispensing BUSINESS, same hands many years. Large house, garden, &c. Returns nearly £1500, profits above the average. A most reliable BUSINESS. Satisfactory reasons for selling. Principals with £1300 cash apply to CHEMIST, 1, Chepstow Ter., Peckham Rd., S.E.

ESTABLISHED 40 Years. For sale, owing to blindness. Valuation £50. Capital opportunity for a Prescriber. WALKER, Chemist, Chapeltown, Pudsey, Leeds.

BUSINESSES WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

CHEMISTS about retiring.—A good class Retail and Dispensing BUSINESS wanted, to which advertiser could have about 6 months' introduction as Assistant. Must bear the strictest investigation. Principals only treated with. Address, with full particulars, in confidence, W. L., 19, Wightman Villas, Wightman Rd., Hornsey, N

FOR Cash. A good class Retail and Dispensing BUSINESS. Returns about £1,000. A fair price will be given for a really bonâ fide concern. Send full particulars, in confidence, to Mr. Walker, 4, Railway Ter., Forest Hill, S.E.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

MIDLANDS.—Cathedral city. Light Retail and DISPENSING. Returns £1100. Price about £1100.

EAST COAST.—Retail and DISPENSING. Returns £600. Price £500. Agency pays rental.

MIDLANDS.—Good locality. Retail and DISPENSING. Returns £600. Profits good. Price £550.

HOME COUNTY.—Light Retail and DISPENSING. Present hands 30 years. Returns £950. Price £850.

LONDON, S.E.—Retail and DISPENSING. Returns £850. Nett profit £350. Price £800.

LONDON, W.—Good class Retail and DISPENSING. Price £450. Rent nearly made by letting.

LONDON, W.—Retail and PRESCRIBING. Returns £500 by assistant. Price £250. A rare opportunity.

F. J. BRETT,
VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

Valuations.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Probate and Fire Insurance valuations.

Nottinghamshire.—Returns £5000. Mixed Drug, Oils and Colours, and Mineral Waters, with some Grocery. Premises are commodious and well adapted to the business, which is capable of considerable extension. Valuation about £3000. Part can remain.

Cheshire.—Death vacancy. Old-established Concern, returning £650 under disadvantages. Position good. Price about £550.

Birmingham.—Death vacancy. Light Retail and Prescribing, with some Dispensing. Returns £400. Valuation £250.

Birmingham.—Death vacancy. Old-established Concern. Profitable. Returns £500. Price £500. Open to offer.

Staffs.—Death vacancy. Returns £875. Price £450.

Liverpool (near).—Dispensing and light Retail. No patents. Capable of considerable increase. Returns £700. Price about £650.

Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. Brett, Leicester.

IMPORTANT TO CHEMISTS FITTING-UP, &c.

FOR Sale.—The complete Fittings of a Shop, in pine, stained mahogany and polished, Bottles, Jars, &c., carriage paid, £60; all quite new.

Handsome second-hand 4-ft. Dispensing Case, with tablet, £3 10s. 12-ft. range French-polished pine Drawers (new), gold labelled and crystal knobs, £6 12s. 12-ft. range mahogany ditto, plate-glass labels, £9. Handsome mahogany Case, with desk and tablet, 50s. Four 4-gal. pear-shaped Carboys, 10s. each. Four 6-gal. ditto, 14s. each. Pine Wall Case, French-polished, 6-ft. long, £8. Twenty-four 2-lb. blue Jars, labelled, 1s. 6d. each. Ditto 3-lb., 2s. each. Twelve 4-lb. best pink ditto, labelled, 5s. each. Handsome 4-ft. bent front plate-glass Case, with mirror back, 80s. Fifteen dozen gold labelled Shop Rounds and Jars (new), £8 10s. Handsome Globe Lamp and Bracket, any inscription, 110s. Two 8-gal. pear-shape Carboys on handsome octagon mahogany stands, nearly new, 60s., cost nearly double. Two 3-gal. Carboys, 6s. each. Four 2-gal. ditto, with cut stoppers, 5s. 6d. each. Illustrated lists and estimates free.—R. Tomlinson & Sons, Midland Medical Fitting Warehouse, Bond Street, Constitution Hill, Birmingham.

AGENTS WANTED.

KERPOD, or Christy's Chilblain Cure, having been approved of by the profession and the public, we are prepared to appoint agents in the principal towns throughout England upon liberal terms. No further notice will be given. Apply, at earliest, to T. Christy & Co., 25, Lime St., E.C.

MAGIC LANTERNS.

Dissolving Views. The Pamphengos gives 12 feet picture. Malden, Esq., compares it to limelight. Triplexicons, 3½, £2 2s.; Duplexicon, 3½, 30s.; Limelight Biunials and Triples. 500 testimonials. 50,000 slides, from 1s. Novelties. Effects. Chemists would find Lantern very profitable recreation for hiring. Charming amusement. Illustrated Catalogues, 8d.; ditto Pamphlets, 2d. The Presto Carriers; The Circulotatory Pamphengos.

W. C. HUGHES, Patentee.

Brewster House, Mortimer Road, Kingsland, N. London.

CHEMISTS' TRANSFERS.

32, Ludgate Hill, London.

MESSRS. ORRIDGE & CO., Chemists' Transfer Agents, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. Orridge & Co. has been known as a Transfer Agency in the advertising columns of the Pharmaceutical Journal since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer :—

1. London, W.—Dispensing Business, situate in a first-class locality. Returns nearly £700. Capital house, in main road. Price £900.
2. London, S.W.—Dispensing and Retail. Returns £600 yearly, with good profits. Handsomely fitted shop and good stock. House in capital order. Small garden and conservatory. Price £600.
3. London, S.E.—Dispensing, Prescribing, and Retail. Established many years. Situate in a busy locality. Returns nearly £850, with excellent profits. Shop well fitted and good stock. Good house, with yard, &c. Price £800.
4. Kent.—Busy market town. Old-established Business, well situate, and offering special opportunity to an energetic man. Present returns about £800. Vendor having special reasons for immediate sale will accept valuation of stock and fixtures, without premium. Gentlemen with £400 are invited to treat. Reference must be enclosed.
5. Kent.—Good class Dispensing and Retail, in a large town within easy access of London. Returns over £900 yearly. Profits very good. Well stocked. Handsome shop and good house. Price £875. Part may remain on approved security.
6. Western County.—Large town. Dispensing and Retail Business. Returns between £1300 and £1400. Good old-established trade. Good house. Rent very moderate. Full particulars on application.
7. Easy Distance of Town.—Returns nearly £300. Price £250.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

MARK SMITH, Chemist,
Valuer and Transfer Agent,
LOUTH, LINCOLNSHIRE.

Fletchers' Liquors.

WE have now completed arrangements for the manufacture and supply of Concentrated Liquors for the extemporaneous production of

Decoctions, Infusions, and Tinctures.

FLETCHERS' CONCENTRATED LIQUORS FOR SYRUPS have long since earned for themselves an established reputation among Pharmacists in all parts of the world. They are in fact everywhere recognised as part of the necessary equipment of the dispensing counter. Most of the arguments which have been advanced in favor of preparing Syrups fresh and fresh, as required, from our Concentrated Liquors, apply with equal force to Decoctions, Infusions, and Tinctures.

Space will not admit of a recapitulation of these in detail, but we respectfully invite attention to the following

SEVEN GOOD REASONS

why our new Liquors should commend themselves to Pharmacists:—

1. **Because, being manufactured by intelligent processes which are the practical outcome of the most recent scientific research, they represent the various medicaments in the highest possible condition of excellence.**
2. **Because, being carefully standardized in our own Laboratory, they may be relied on as definite in composition and constant in strength.**
3. **Because they yield products which are always bright and handsome in appearance, and which do credit to the dispenser.**
4. **Because they will keep fresh and good for almost any length of time, and therefore do not deteriorate in value.**
5. **Because they occupy far less bulk than the old-fashioned "Concentrated Infusions," &c., and thus effect an important saving in carriage and storage, besides being more convenient to handle. Foreign buyers will attach special importance to these advantages.**
6. **Because, in many instances, they obviate the necessity of stocking three or more preparations of the same drug.**
7. **Because, though we do not profess to base the merits of our manufactures on cheapness alone, it will be found on comparison that our Concentrated Liquors are much more *economical* than weak preparations of the same drugs made by the antiquated, clumsy, and wasteful processes too frequently adopted.**

Descriptive Pamphlet, with full detailed Price List, together with Trial Specimens, free on application to the Sole Manufacturers,

FLETCHER, FLETCHER & STEVENSON, Manufacturing Chemists, London, N.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The

Pharmaceutical Journal

AND

Transactions.

THIRD SERIES, No. 903.] SATURDAY, OCTOBER 15, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 9th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, Nov. 2nd, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 2nd day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 5th, 1887.

There are at present *forty-six* annuitants, receiving £1575 per annum, and casual relief is also granted, amounting to upwards of £600 per annum, involving a total annual expenditure of about £2200.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of
Half-a-crown are entitled at each election of Annuitants to .. .. ONE Vote.
Five Shillings .. .. TWO Votes.
Half-a-guinea .. .. FIVE Votes.
One Guinea .. .. TEN Votes.
And to increase in the same proportion.

Five Guineas are entitled to .. .. FIVE Votes for life.
Ten Guineas .. .. TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-SIXTH SESSION, 1887—88.

COMMENCING OCTOBER 3rd, 1887.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.
Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

Professor WYNDHAM DUNSTAN.....CHEMISTRY.
Professor ATTFIELD .....PRACTICAL CHEMISTRY.
Professor GREEN .....BOTANY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.
Mr. HOLMES .....MATERIA MEDICA.

CHEMISTRY.

Lectures on Monday, Tuesday and Wednesday mornings, at 9 o'clock, comprising the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.
3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures. First Course, October to February. Second Course, March to July.

PRACTICAL CHEMISTRY.

Daily, at 10 o'clock, in the Laboratory, by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore enter for any period at any date. A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

BOTANY.

Lectures on Friday and Saturday mornings, at 9 o'clock, comprising the following subjects:—

1st Course.—Structural Botany, and the Physiology of the plant. October to February.

2nd Course.—Structural and Physiological Botany, but with especial reference to Practical Botany and the Classification of plants. March to July.

All the lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

MATERIA MEDICA.

Demonstrations in Vegetable and Animal Materia Medica every Thursday Morning, at 10. First Course from October to February; Second Course from March to July.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations every Tuesday, Thursday and Friday, at 5 p.m. First Course from October to February. Second Course from March to July.

Application for admission to the School, for Prospectuses, or for further information, may be made, personally or by letter, to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

THE PHARMACEUTICAL JOURNAL

Guaranteed Circulation of 7000 Copies Weekly.

(The LARGEST Issue of any Journal addressing Chemists and Druggists.)

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SPECIAL TERMS FOR THE FOLLOWING ADVERTISEMENTS.

ASSISTANTS WANTED, BUSINESSES FOR DISPOSAL, BUSINESSES WANTED — Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional line not exceeding seven words, or less, 6d.

ASSISTANTS SEEKING ENGAGEMENTS *only* — Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.

*** *In these Advertisements, Two Initials or Two Figures count as one word.*

Advertisers are requested to observe:—

1.—That Advertisements are received by the Publishers not later than Ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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Fig. 6.

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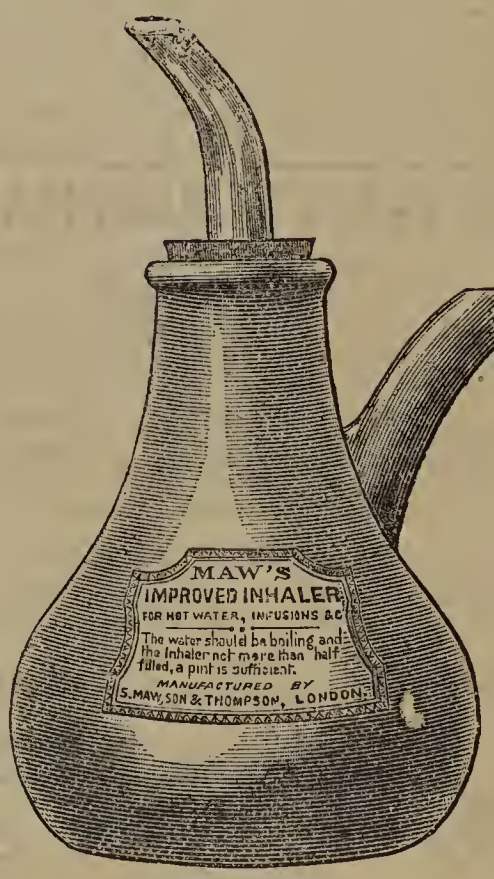

Fig. 8a.

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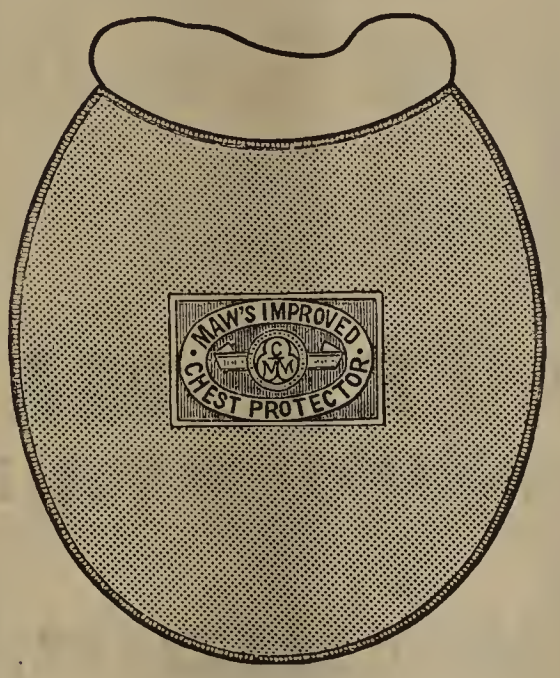

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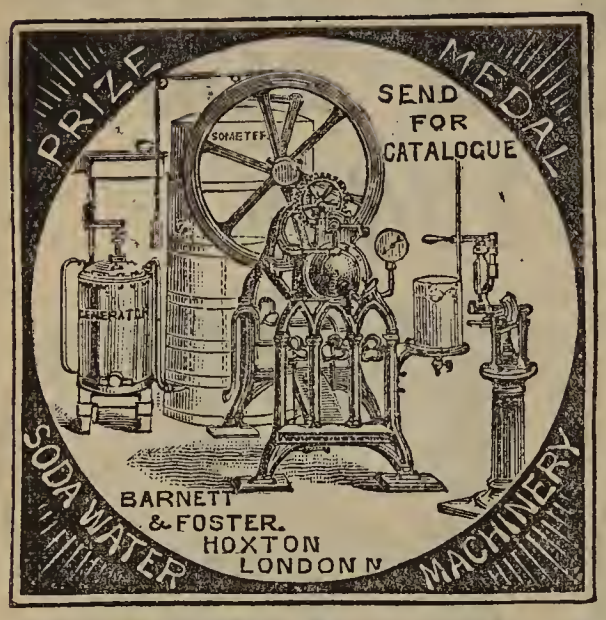

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To us it appears truly humorous that firms whose antiquity is their prime boast, and whose traditions harp upon the integrity of ancestral founders, should play such catch penny antics. Having won by genuine merit and originality the confidence of the profession and trade, we can, so far as we ourselves are concerned, regard these puny pirates very much like the story of the bad marksman shooting at the frogs, it was sport to the one and didn't hurt the others. Still, they give us a theme to descant upon. It is our duty to protect our friends.

When the lame man made a bargain with the blind man for the latter to carry him, they were neither of them in business worth mentioning, and the bargain was mutually advantageous; but for one who might both walk and see to saddle himself on to another is not delicate to say the least. We feel that we can see and walk, and when those who might do the same try to ride on our industry, it seems our bounden duty to point out to them how unbecoming their conduct really is.

We have become more or less used to imitators, and when the thing is done right handsomely, it almost seems like a compliment, but to be a compliment it should certainly be free from the semblance of fraud. "Me too" has ever been the motto of trade pirates, and of those who have lost their grip, and of those who never deserved.

For the edification and comfort of our imitating neighbours we offer an allegory, it is a very ripe chestnut—but a sound one—and here it is. Once upon a time—not so very long ago—as the story goes, a company of soldiers were garrisoned in mountain wilds where there were Indians on the war-path. One day a tribe of the Red Men were spied in a valley, and the soldiers were forthwith ordered out in great haste. They strapped a cannon on to the back of a mule, and hastened away to give battle. When they reached the crest of a cliff they saw the war-dancers in the valley below.

They had no time to dismount the cannon, so turned the mule about as a gun carriage and fired. The howitzer "kicked" so tremendously that it knocked the animal off his legs, and cannon and mule rolled precipitately down the hill into the midst of the Indians, scaring them nearly out of their wits, and frightening them into a hasty retreat—all but one, who was so paralysed with fear that he allowed himself to be captured and taken to the camp. When interrogated as to why he allowed himself to be taken, he exclaimed—"Me no 'fraid soldier man, me no 'fraid of cavalry man, but when live jackasses 'fired me, me think the devil must be near."

Though we do not confess that we are timid, or much unnerved, the Indian's case is in some respects like our own. Legitimate business warfare may be engaged in with satisfaction, and we heartily applaud all new improvements and legitimate enterprises from whatever source they come, but who likes trade "jackasses" precipitated upon them as competitors.

Now, Imitators, we enjoin upon you to discard your schoolboy mimicries. We don't expect much of you.

"* * * No earth born will
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Our truest steps are human still,
To walk unswerving were divine."

Still, "Be not too bold!" "assume a virtue if you have it not." When you want a new name for one of your products (or imitations) give it a name that does not deceive. Give it a name that has not not been made valuable by others' expenditure and industry. Give it a name that when you make your sales, you can say to yourselves—These do not rightfully belong to another. What is it to appropriate a trade name but to take what another has laboured for and that may become in all equity his means of subsistence. Sales thus made are dearly bought. A word more; we would suggest that those whose enfeebled intellects prevent them from creating anything original, and who find it necessary to copy our advertisements, might do so in such a manner that readers will not be led into mistaking and reading their pages for ours.

Those who have, through inadvertance, trespassed upon our rights, and who have made the *amende honorable* when we have called their attention to the trespass, we acquit of all wrong intent, and can but respect their frankness and honesty of purpose. Everyone is liable to tread unwittingly upon the rights of their fellow-men, but an honest man is ready to admit his fault and relieve his conscience. Wilful trespassers, who persist in wronging us, and thereby render themselves liable under the law, we have punished and shall punish with the utmost severity. Those who wilfully trespass upon our rights, but cunningly evade the liabilities of the law, we shall expose to the ignominy they so justly deserve.

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GLEDITSCHIA TRIACANTHOS.

BY DR. B. H. PAUL AND A. J. COWNLEY.

Having received from Mr. Holmes, the Curator of the Society's Museum, a small quantity of the leaves of this plant, referred to in the Journal of September 17 as being the reputed source of an alkaloid analogous to cocaine in possessing the power to produce local anæsthesia, we have examined this material with the view of ascertaining whether it really contained such a constituent. In the absence of any information as to the means by which the alleged anæsthetic base is to be extracted, we proceeded in the first instance to exhaust the leaves with cold ether. In this way a small proportion of dark green coloured material was obtained, which evidently consisted for the most part of chlorophyll and a waxy substance such as is generally met with associated with chlorophyll in the ethereal extracts of green leaves. On heating this green extract with a small quantity of dilute hydrochloric acid it was but very partially dissolved, and the clear filtered solution gave no evidence of the presence of a base when supersaturated with ammonia. The acid solution was also free from bitter taste, and when applied to the lips or tongue it did not produce any numbing sensation, like that caused by a solution of cocaine.

In order to facilitate the extraction of any basic constituent that might be present in the leaves they were further treated with ether in the presence of ammonia solution sufficient to render the mixture decidedly alkaline; but in this second experiment no better result was obtained than in the former case. The leaves were then exhausted with a weak aqueous solution of hydrochloric acid, and the dark brown liquor thus obtained gave a rather copious precipitate on being mixed with ammonia in slight excess. The precipitate did not present the characters of an alkaloid, and to ascertain whether it might not contain such a substance in combination with tannic acid, or a similar body, it was collected on a filter, mixed with hydrate of lime, and then treated with strong alcohol. Again the result obtained was a negative one, and there appears to be sufficient reason for concluding that the leaves supplied to us as being the source from which the alleged basic substance named "stenocarpine" is obtainable did not contain any constituent of that nature.

It must be mentioned, however, that there may be some uncertainty as to whether *Gleditschia triacanthos* is really the plant referred to by Mr. Goodman and Dr. Claiborne as the one from which the anæsthetic base was obtained. The account given of the plant in the original article is somewhat indefinite, and it was merely stated that it resembled *Acacia stenocarpa*, which is a native of Nubia and Abyssinia, but that its botanical name was unknown. The tree was described as growing in Louisiana to a height of 35 or 40 feet, with a bole of about 18 inches diameter and a spread of foliage of from 30 to 35 feet, the bark being smooth and the leaves like those of an acacia. The occurrence of clumps of forked spines or thorns on this plant appears to have led to its being termed locally the "tear blanket tree," "wild locust," "honey locust," or "thorn locust." So far as these names are to be found in botanical works they are applied to *Gleditschia triacanthos*, and that circumstance appears to be the only reason for supposing that this was the plant referred to. But if that supposition be correct it is most probable that stenocarpine is a myth.

NAREGAMIA ALATA, THE GOANESE IPECACUANHA.

BY DAVID HOOPER, F.C.S.

Dr. Dymock, in his 'Vegetable Materia Medica of Western India,' describes *Naregamia alata*, W. and A., of the natural order of Meliaceæ, as the country ipecacuanha of the Portuguese at Goa, and states that it is the best indigenous emetic he has met with in that part of India. As the drug seems to be devoid of history it was probably unknown in the sixteenth century, when the intelligent and observant Dr. Garcia d'Orta was for thirty years physician to the Viceroy's Court and the hospital at Goa. In confirmation of the recent introduction of naregamia, its use does not appear to have extended far beyond its habitat. The plant grows from the Concan southwards by the Malabar coast to Travancore, preferring the slopes of the Western Ghauts. By the natives in these regions it is used as an emetic, and as a remedy for bile, rheumatism and indigestion, usually in the form of a decoction or infusion. The sample that I have examined was kindly procured for me by Mr. Ferguson, of Calicut; it was collected some nine or ten miles from the town, where it has a reputation in cases of fever, and grows in some abundance.

Vernacular.—Kápúr bhendí, pit-wel, tinpana (*Marathi*), trifolio (*Goa*), nelanaringu, nelakanu-gida (*Canarese*).

Botanical Characters.—The naregamia plant (of which there is only one known species in India) is a small glabrous or shining undershrub, not more than a foot in height, with several slender, woody, erect or decumbent stems, with few branches. The leaves are from one to four inches long, and trifoliolate. Leaflets, sessile, cuneate-obovate, entire or obtusely lobed, terminal leaflet rather larger than the lateral ones and about the length of the common winged-petiole. Peduncles axillary, solitary, one-flowered. The flowers are about one inch long and quite white. Styles yellow. Capsules triangular and three-valved. It is a very attractive plant in the flowering season, which extends from the middle of April to the middle of June.

Description.—The drug consists of the root with the slender stems attached to it, the leaves having been stripped off. The root stock is contorted and warty and with the roots is pale brown in colour; the mealy suberous layer may easily be removed by rubbing. The stems are of a dirty-green, with the bark more firmly adherent. A transverse section of the root exhibits a brown outer layer of bark with a light-coloured interior, and a yellowish wood. If the section be touched with a drop of iodine solution a blue ring will appear in the bark, showing the presence of starch in the librous portion. On account of the hard wood the drug is very difficult to powder in a hand mortar. The activity of the drug resides in the cortical portion, but as this forms one-third, and the woody material two-thirds of the whole, it differs from the true ipecacuanha. The powder is light brown; it has a peculiar aromatic and pungent odour, and a slightly bitter and nauseous taste.

Chemical Composition.—Powdered naregamia was treated both consecutively and independently with the following solvents:—Ether, alcohol, water, diluted acid and diluted alkali. The ether extract contained an *alkaloid*, an *oxidizable fixed oil* and a *wax*.

The alkaloid was separated by agitating the extract with diluted sulphuric acid, and the clear colourless solution at once afforded precipitates by the usual reagents. The alkaloid was left as an amorphous, slightly coloured residue of a brittle consistence, on the gentle evaporation of its ethereal solution. It formed crystalline salts with sulphuric, nitric and hydrochloric acids, but gave no satisfactory colour reactions when mixed with the concentrated acids. It was precipitated from its solutions by tannin, potassio-mercuric iodide, phosphomolybdate of soda, and iodine. It differs from emetine in readily forming acicular crystals with acids, and by not giving any colour with chlorinated lime and acetic acid; and it differs from the principal cinchona alkaloids by its optical inactivity. Having such definite peculiarities in its properties and reactions, I propose to call this alkaloid after the generic name of the plant, *naregamine*.

The fixed oil was soluble in strong spirit, soluble also in dilute caustic soda with a brown and red fluorescent solution. The wax was insoluble in spirit, it was coloured brown and afterwards black by sulphuric acid.

The alcoholic extract consisted mainly of *sugar* with some little resinous matter. No tannic substances were detected, but a body precipitable by neutral plumbic acetate, related to an organic acid.

The aqueous extract evaporated to a small bulk, and treated with two volumes of alcohol, gave a precipitate of *gum*. The filtrate from this, evaporated and treated with four volumes of alcohol, caused a precipitate which after standing some hours separated out into large colourless rhombic prisms. A crystalline alkaloidal substance soluble in water, insoluble in strong spirit, having an acid reaction, containing nitrogen, and occurring in this extract, shows that it is allied to, if not identical with, *asparagine*.

Among the less important constituents of naregamia are *albuminous*, *pectinous* and *colouring* matters, *starch*, *cellulose*, *woody fibre* and *ash*. The starch is in minute rounded granules of about the same size as rice. The ash is of a reddish colour, and contained 10 per cent. insoluble in hydrochloric acid.

The following table will show in what amount the various principles occur :—

Ether extract	2·93
Alcoholic extract	5·40
Aqueous extract.	7·00
Albuminous matter, etc.	7·61
Starch and cellulose	17·66
Woody fibre	44·77
Ash	5·52
Moisture	9·11
	100·00

Medical Properties.—About 1 ounce of the powdered naregamia was sent to Surgeon-General Bidie, who undertook to have some experiments made on its therapeutic action in the Monegar Choultry Hospital, Madras. I have been favoured by Dr. Bidie with the medical report, which contains the following information :—"The powder was tried in two cases of dysentery. The first patient had a very severe attack of the disease, and had recovered from a similar attack only a month before, and was in consequence in a very weak and emaciated state. After three doses, all traces of blood in his motion disappeared. The drug was administered in doses of 20 grains, preceded by 15 minims of tincture of opium. The second patient also recovered rapidly, but the disease was not so severe as in the first case. As an emetic its effects were exactly similar to the officinal drug, 20 grains acting as an effectual emetic in an adult. It was also tried in small doses as an expectorant in catarrhal affections with good results, and was effectual in the treatment of children suffering from bronchitis."

The results of these experiments confirm Dr. Dymock's experience of the emetic property of naregamia, and Dr. Bidie intends to have more extended trials made with it in dysentery and other complaints.

Pharmacy of Naregamia.—The "vinum" being a recognized preparation of the true ipecacuanha, a vinum naregamiæ was made by using sherry containing 15·16 per cent. absolute alcohol by weight, 2·4 per cent. solids, and traces of tannin. The finished product, however, could not be recommended as a suitable preparation, for the following reasons :—1. The wine deposited after standing a few days. 2. Large doses were taken, much in excess of the official wine, without producing an emetic effect. 3. Naregamine is precipitated by tannin, which is frequently found in sherries. 4. Naregamine was detected with facility in the residual marc. If a liquid preparation is required, I should suggest a tincture made with the powdered drug and rectified spirit of the strength of 2½ ounces to 1 pint. The alcohol dissolves out the alkaloid and most of the fatty constituents, and the tincture exhibits the activity of the root. Powdered naregamia is the form in which it will chiefly be used; it is conveniently carried about, and is simple in its administration.

Ootacamund, India.

NOTES ON CHINESE MATERIA MEDICA.*

BY CHARLES FORD, F.L.S.,
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HO KAI, M.B. ABERD., ETC.,
AND WILLIAM EDWARD CROW, M.P.S.,
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(*Continued from page* 175.)

In referring to figures or descriptive matter in Chinese works, the volume (or chapter) and page, will, in future, always be given, except in the case of the 'Pên ts'ao kang mu.' There have been so many editions of this work since its appearance more than three hundred years ago, that any reference to a particular page would only be misleading; we shall, therefore, when quoting from the text, simply give the chapter. As the illustrations are all grouped together, in either two or three books, we have added in MS., as suggested by Hanbury, the series of numbers which have been, and will always be, associated with his investigations; and in succeeding notes we shall continue to refer to the 'Pên ts'ao' figures in this way.†

* Reprinted from advance sheets of the *China Review*, communicated by the authors.

† The woodcuts of the 'Pên ts'ao' amount in number to 1110, and illustrate the various minerals, vegetables and animals furnishing material in use as medicines by the Chinese. Hanbury numbered them beginning with *Chin* (gold), —the first of the plates, and ending with *fei fei* (a kind of monkey)—the last of the figures. In other words he exactly followed the order of the Chinese text. The vegetable section commences with No. 88 *Kan ts'ao* (liquorice) and ends with No. 829 *hsien jên ch'ang* (a sort of bamboo). There are *usually* four illustrations on each page, but in them the black spaces should of course be disregarded.

Subjoined will be found a list of the principal works to which a reference will frequently be made, and which, in future, will always have their titles abbreviated. These references will usually be given in foot-notes, but a list of authors dealing with the subject under notice, whose works are not specially alluded to, will appear at the end of each note.

'Flora Cochinchinensis.' Joannis de Loureiro, edit. C. L. Willdenow, 1793.

'*Catalogus medicamentorum sinensium quæ Pekini comparanda et determinanda curavit Alexander Tatarinov, Doctor Medicinæ, medicus Missionsis Russicae Pekinensis spatio annorum* 1840–1850. Petropoli, 1856.'

'Contributions towards the Materia Medica and Natural History of China.' By Frederick Porter Smith, M.B., Lond.; Shanghai, 1871.

'La Matière Médicale chez les Chinois.' M. le Docteur J. Léon Soubeiran et M. Dabry de Thiersant. Paris, 1874.

'Early European Researches into the Flora of China.' By E. Bretschneider, M.D.—In *Journal of the North-China Branch of the Royal Asiatic Society* (1880), vol. xv., pp. 1–194.

'Botanicon Sinicum.' By E. Bretschneider, M.D.—In *Journal of the North-China Branch of the Royal Asiatic Society* (1881), vol. xvi., part 1, pp. 18–230.

'Flora Hongkongensis.' By George Bentham, F.R.S. London, 1861.

'Supplement to the Flora Hongkongensis.' By Henry Fletcher Hance, Ph.D., etc. London, 1872.

'Pharmacopœia of India.' By Edward John Waring, M.D. London, 1868.

'Science Papers, Chiefly Pharmacological and Botanical,' by Daniel Hanbury, F.R.S. Edited by Joseph Ince, F.L.S., etc. London, 1876.

'Pharmacographia: A History of the Principal Drugs of Vegetable Origin met with in Great Britain and British India.' By F. A. Flückiger, Ph.D., and Daniel Hanbury, F.R.S. London, 1879.

'Medicinal Plants.' By R. Bentley, F.L.S., etc.; and Henry Trimen, M.B., etc., vol. 1–4. London, 1880.

'Vegetable Materia Medica of Western India.' First Edition. By W. Dymock, Surgeon-Major, Bombay Army. Bombay and London, no date.

'Reports of the Medical Officers to the Chinese Imperial Maritime Customs.' Shanghai, No 1 (1871), to present time.

Pharmaceutical Journal. London.

'Year-Book of Pharmacy and Transactions of the British Pharmaceutical Conference. London, 1870 to present time.

'Canton Plants.' By E. H. Parker, of Her Majesty's Consular Service, in *China Review*, vol. xv., pp. 104–119.

'Szechuen Plants.' By E. H. Parker, in *China Review*, vol. xi., pp. 339–342.

The Chemist and Druggist. London.

China Review. Hong Kong.

'Returns of Trade at the Treaty Ports of China.' Imperial Maritime Customs. Shanghai.

'Flora of British India.' By Sir J. D. Hooker. London.

'The Elements of Materia Medica and Therapeutics.' By Jonathan Pereira, M.D., F.R.S. Fourth Edition. Edited by A. S. Taylor and G. O. Rees. London, vol. ii., Part 1, 1885, and vol. ii., Part 2, 1857.

'Plantæ Davidianæ ex Sinarum Imperio.' Par M. A. Franchet Première partie. Plantes de Mongolie, du Nord et du Centre de la Chine. Paris, 1884.

'Index Floræ Sinensis: An Enumeration of all the Plants known from China Proper, Formosa, Hainan, Corea, the Luchu Archipelago, and the Island of Hong Kong, together with their distribution and synonymy.' By Francis Blackwell Forbes, F.L.S., and William Botting Hemsley, A.L.S. Parts I. and II. London, 1886.

'Chinese Commercial Guide.' By S. Wells Williams, LL.D. Hong Kong, 1863.

The Journal of Botany. London.

'Pên ts'ao kang mu.' By Li Shi chen. See 'Botanicon Sinicum,' p. 54.

'Chih wu ming shih t'u k'ao.' By Wu K'i sün. 1848. See 'Botanicon Sinicum,' p. 72.

8.—Datura Alba,* Nees. Thorn Apple. N. O. Solanaceæ. Chinese names:—*Wan t'o lo hua* and *Nao yang hua.* 'Pên ts'ao,' ch. xvii., fig. 365; 'Chih wu,' pt. I., ch. xiv., p. 89, no figure; 'Hsi yüan lu,' vol. iii., p. 46.—A study of this important drug affords an illustration of a fact which ought never to be overlooked by the student of Chinese Materia Medica, viz., that in different parts of the Empire of China, the same plant has often several names, and that the same name is sometimes awarded to dissimilar plants. In the 'Pên ts'ao,' where this plant is both figured and described, and in the 'Chih wu,' where only a description is given, it occurs under the name *Wan t'o lo fa.* The name *Nao yang hua* is also found in both these works, but as a synonym of *Yang chih chu*,† a plant which from the excellent figure in the latter, is unquestionably a species of *Azalea* or *Rhododendron.* The observations of Tatarinov‡ prove that in the North of China a species of *Datura* is known by the first name;§ and the investigations of Loureiro,‖ J. Russel Reeves, E. H. Parker¶ and ourselves, establish, so far as the Kwantung province is concerned, the identity of the second name with the plant under notice.

In the 'Pen ts'ao,' the following occur as synonyms of *Wan t'o lo hua*, viz., *Fêng ch'ieh érh* and *Shan ch'ieh tzŭ.*

History, Uses, Etc.—The celebrated Jesuit missionary Loureiro was the first European to mention *Datura* as an article of Chinese Materia Medica. In his 'Flora Cochinchinensis' (p. 136)—a work defined by Dr. Bretschneider as "a valuable monument of conscientious labour and considerable research"—it is mentioned as a soporific, inebriant, and antispasmodic. The smoke of the bruised root is described as affording temporary relief in asthma, and a topical application of the bruised fresh leaves is said to be efficacious in the treatment of hæmorrhoids and offensive ulcers.** In the 'Hsi yuan lu,' or Instructions to Coroners, it is referred to in the following terms:—"When taken internally, it produces insensibility, and death frequently results therefrom." In the Kwangtung province, it is used to produce stupefaction for the purpose of theft or kidnapping, and we have seen many such cases brought before the courts.

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* *D. fastuosa*, Linn., in Sir J. D. Hooker's 'Flor. Br. Ind.,' iv., 242; *D. alba*, Nees, and *D. metel*, Roxb., are regarded as mere varieties.

† 'Pên ts'ao,' ch. xvii., fig. No. 366; 'Chih wu,' pt. 1, ch. xiv., p. 56 and pt. 2, ch. xxiv., p. 19 (figure). In the North of China there is still some confusion surrounding the flowers known as *Nao yang hua* and *Yang chih chu.* In Tatarinov's 'Catalogue' the former are mentioned as derived from a species of *Hyoscyamus* (No. 309), and the latter are doubtfully referred to *H. niger* (No. 223). Porter Smith states that the *Andromeda*, *Hyoscyamus* and *Azalea* are more correctly called by these names. ('Cont. to Mat. Med.,' p. 84.) Soubeiran and Dabry de Thiersant state that their specimens were solely those of an *Azalea.* ('Mat. Med.,' p. 191.)

‡ *Cat. Med. Sin.*, Nos. 177 and 476.

§ The 'Chih wu' description of *Wan t'o lo* without doubt resembles that of a *Datura.*

‖ 'Flor. Cochin.,' p. 135.

¶ 'Canton Plants,' p. 107.

** We give Loureiro's account of the uses of *Datura* because of the high value of the observations he makes on the medicinal virtues of the plants mentioned in his Flora. He remarks—"Habitat inculta per vias et hortos in Cochin-China, in China et in Africa, ubi a me sæpe examinata;" but does not say to which country the uses subsequently detailed are applicable. The description tallies, however, with the accounts of more recent investigators. (See Bretschneider, *Ear. Eur. Res.*, for an opinion on the value of Loureiro's work in particular and that of the Jesuits in general.)

A plant called by the Chinese *Nao yang hua* had long been known to police magistrates in Hong Kong, as furnishing material in use by robbers to drug their victims; but although frequently brought to notice in the Law Courts, we have failed to find any reference to warrant our assuming that prior to 1882 it had been identified by the authorities with the well-known *Datura alba.**

It is singular that in only one of the extensive series of reports of Medical Officers to the Chinese Imperial Maritime customs, do we find any reference to the use of *Datura* by the Chinese. This occurs in Dr. Dudgeon's report on the health of Pekin for the half-year ending March 31st, 1875,† where it is stated to be "recommended in all wind diseases (convulsions): when eaten, unconscious laughter is set up, and the person acts as if intoxicated. It may be used as an anæsthetic, and in infusion as a wash for the feet. It is also applied to ulcers of the face, in convulsions of children, and in prolapsus ani."

In the official medical records of Hong Kong, the first mention of *Datura* is made by Mr. Hugh McCallum, in the analytical section of the Colonial Surgeon's annual report for 1882.‡ Mr. McCallum, the then Government Analyst, has obligingly placed at our disposal some notes of the investigations made by him which led up to the discovery that a Solanaceous plant and possibly *Datura alba* was a common stupefying agent amongst the Chinese in Hong Kong. He states, that during the years 1880–1882, cases of alleged drugging were frequently before the courts, and nearly always connected with robbery, the victims being in most cases returned emigrants. An impression seems to have pervaded the minds of the magistrates and the police, that the complainants were either drunk from alcohol, or that the cases had simply been trumped up by some evil-disposed person for the sake of revenge. In June or July, 1882, a Chinese female child was brought late one evening to the Civil Hospital by the police, in a narcotized condition. The girl had been stolen, and was found by the police in a junk about to leave the harbour. When roused, the child was most vicious, and the temper displayed by her pointed to madness. The pupils of both eyes were widely dilated. Left alone the child soon fell asleep, and next morning, beyond displaying great stupidity, was quite well. The pupils were still dilated.

Mr. McCallum then proceeded to examine a bundle of flowers reputed by the Chinese as a stupefying drug, an extract of which acted as a powerful mydriatic, both when administered internally and when applied locally to the eye. Some of the extract was given to a small monkey, and the effects produced by it were similar to those observed in the case of the little girl. The flowers were submitted to the Director of the Botanic Gardens, and identified as those of *Datura alba*.

Shortly after this, and while the *Datura* investigation was still being conducted in the Government Laboratory, a second instance of mydriatic poisoning was brought to the notice of the Civil Medical authorities. Mr. McCallum's note of this case runs as follows:—"A Chinese barber in good health, but old and anæmic, soon after the beginning of his evening meal, felt himself getting giddy, and shortly afterwards became unconscious. He was found by the police next morning still stupid and talking a lot of nonsense. When brought to the hospital at 11 a.m., his gait was unsteady; he trembled and looked very foolish. The pupils of both eyes were widely dilated, and he complained of a pain in his throat. Next day he recovered; the pupils were, however, still dilated, and he complained of feeling giddy." In his official report, Mr. McCallum remarks that "unfortunately it was impossible to prove what particular plant was used in either of these cases, but no doubt it was a *Datura*, and most probably the variety known as *Datura alba*."

Since 1882, there have been several cases of poisoning by *Datura*. We shall, however, only allude to a particular case which came under the notice of one of us, wherein it was conclusively proved that the flowers of *Datura alba* had been employed.

At about 5 a.m., on the 8th of May, 1885, two adult females (Ch.) and an adult male (Ch.) were brought by the police to the Civil Hospital, suffering from a mydriatic poison. As the police version of the affair was so confusing, it was decided to defer making inquiries until the patients had so far recovered as to be able to remember the early details of the occurrence.* On the morning of their discharge from the hospital, the elder of the women stated that about ten o'clock on the night of the 7th, she saw the third patient put a small bundle into the utensil which contained the evening meal. When she inquired why he did this he replied that it was good medicine. Later on, she saw him remove the bundle, and observed that he threw it into a corner of the kitchen. The woman, who gave her evidence in a very straightforward and intelligent manner, was requested to proceed at once to her home, make a careful search for the supposed drug, and bring it at once to the Civil Hospital. In half an hour she returned, bearing in her hand a bundle of flowers, which although somewhat mangled, were easily recognized as being identical with those of *Datura alba*.

There is no record at the Hong Kong Civil Hospital of a single case of *Datura* drugging terminating fatally.

The symptoms, as displayed by the Chinese, appear to vary but little. Soon after the administration of the drug, the victim suffers from dimness of sight, and staggers as he attempts to walk: he chatters away in an unintelligible manner, and laughingly grasps at imaginary objects. This latter is perhaps to the ordinary observer the most striking features in *Datura* poisoning. The patient sits up in bed and picks at the bed clothes as though to catch some passing object, and will amuse himself by attempting to draw out imaginary threads from the ends of his fingers. If the case is a mild one, the patient will, if left alone, fall asleep, and after several hours' rest be practically well. In severe cases the patient acts more like a maniac. He recoils with a shriek from anyone who comes near him, and offers the most violent resistance to medical treatment. In all cases the pupils are dilated, and mydriasis will remain for some time after the other symptoms have subsided.† The effects of *Datura* are usually produced in about fifteen minutes after the administration of the poison, but the activity of the herb would have to be in a liquid form to act so rapidly as this.

The reader is referred to Dr. Norman Chevers' 'Manual of Medical Jurisprudence' for details of cases of poisoning in India by *Dhatura* (the Hindustani name for a species of *Datura*), and for an interesting account of the professional road-poisoners or Dhatureeás.‡

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* I remember a case prior to 1876, where these flowers were believed to have been used for drugging; but no record can be found in proof of this.—C. F.

† *Med. Rep. I.M.C.*, IX., p. 37.

‡ *Hong Kong Govt. Gaz.*, vol, xxix., p. 662.

* Dr. Chevers states that persons who have been drugged by Dhatura "should have more than a week allowed them to recover their memory" ('Med. Jurisp. for Ind.' (1870), p. 210).

† The above does not profess to be a proper physiological note. I have merely recorded what I have often seen in the Hong Kong Civil Hospital—facts which could be noted by any one possessed of ordinary powers of observation.—W. E. C.

‡ In the annual report, for 1885, of the Principal Civil Medical officer, Straits Settlements, the following occurs in the Toxicological section (par. 377, p. 43):—"The symptoms in most, pointed to some variety of *stramonium* or *datura*, administered in the form of decoction or infusion, but the quantities sent for examination have generally been too small from which to extract any of the alkaloids."

Pharmacists ought not to experience much difficulty in obtaining in China a good quantity of this plant for medicinal uses. Even if the supply of the wild variety fails, any number of plants could on demand be grown from seeds in the South of China. In the Hong Kong Botanic Gardens may be seen some very fine specimens raised in this way. The leaves and seeds are included in the 'Pharmacopœia in India' (p. 175); and preparations of them are in constant use for a variety of disorders.

Parts Used and Description.—The fresh entire plant. The leaves vary considerably in size, the largest are about 8 inches long and 5 inches broad, very unequal at the base, ovate acuminate and usually coarsely dentate. When bruised they emit a fetid odour. The flowers are as a rule white, although specimens may frequently be seen of a distinct yellow colour; corolla infundibuliform, from 3 to 5 inches long; calyx about 2 inches long. The sub-globose capsules are about 1¼ inch in diameter, and rest on the enlarged flat persistent base of the calyx; they are armed with a number of spines, and split irregularly when ripe. The seeds, which do not appear to be used by the Chinese, are ear-shaped and of a yellowish brown colour.

The dried flowers, in bundles of various sizes, are the only part of the plant sold by the native druggists. The fresh herb may frequently be seen on the herbalist's stall. The dried flowers weigh on an average 4 grains each.

Habitat.—This species grows in waste places about villages on the island of Hong Kong, and exhibits a special liking for ground in close proximity to a ruined building. On Stone Cutter's Island, under the walls of the old prison, specimens may be seen growing to a height of about 5 feet. Common also on the neighbouring mainland and about the city of Canton (Loureiro, Reeves, Parker, etc.).

An unusually fine specimen was gathered by one of us in Macao this year. It had a corolla 7 inches long.

In 'Remarks on the Botany of S. Manchuria,' by Dr. Morrison of her B. Majesty's Consulate, *D. alba* is mentioned among other important plants of the N. O. Solanaceæ. Writing under date June 6, 1887, Dr. Morrison states, that about Newchwang it is known as *T'ien ma hua* and *La p'a hua*, and that it is applied in the form of an ointment to ulcers and sores. He was unable to ascertain that it was used internally.

Composition.—The plant contains an alkaloid possessing properties similar to atropine. It is usually designated daturine, but, as the "identity of the active principle in both the *Datura* and *Belladonna* tribes is now completely established,* it would be well if toxicologists, in their reports on analyses in cases of *Datura* poisoning, would refer to the basic mixture isolated from the contents of the stomach or bladder simply as atropine. In the absence of a part of the plant, in the material sent for analysis, that will enable the toxicologist to establish the origin of the alkaloid, it is impossible to say that it is a case of *Datura* poisoning. There may be collateral evidence that would justify the expert in giving an *opinion* on this point, but, as a chemist, he cannot go beyond the mere statement that atropine was detected."* Herr Schmidt, writing on the nomenclature of the alkaloids of *Atropa Belladonna* and *Datura Stramonium*, states,† "should it be desired to differentiate between chemically identical atropine according to its origin, it would be simply to make a distinction between atropine from *Atropa Belladonna* and one from *Datura Stramonium*, but not between atropine and daturine."

The detection of the active principle of *Datura* may be affected by following the process described under *Gelsemium elegans*.‡ The final product need not however be tested by chemical reagents,§ because there is no test sufficiently delicate to enable the operator to detect the mydriatic alkaloids of the solanaceous group, when in the minute quantity usually found in the material sent for examinination in cases of poisoning. A neutral solution of the sulphate or hydrochloride of the base should be prepared, and a drop or two applied to the eye. If dilatation of the pupil occurs, a further quantity may be injected into a small animal, preferably a monkey, and the effect noted.

Dr. Sydney Ringer‖ has called attention to the fact that certain animals are almost insusceptible to the influence of some of the mydriatic alkaloids. In 1884,

We are of opinion that if the enquiry is directed into the proper channel, no doubt it will be found that *Datura alba* is in use for criminal purposes in Singapore just the same as in Hong Kong and the Kwangtung province of China. Singapore is more a Chinese than a Malay Colony. In Hong Kong we believe the flowers are generally employed by the criminal: this will probably account for the fact that the majority of cases of *Datura* drugging are not very severe. The violent resistance offered by the victims to the use of the stomach pump and their determination in refusing all liquid emetics render it almost impossible to thoroughly empty the stomach; so that unless the analyst makes a direct search for atropine, there is danger of his missing the poison in the small quantity of material saved. If the food has been drugged, no difficulty should be encountered in detecting the poison, if a fair quantity of the meal has been left.

* Blyth, 'Poisons: Their Effects and Detection' (1884), p. 354.

* As an example of the ignorance on toxicological matters which exists in some quarters, the following instance may be cited:—About two years ago I was called upon to analyse the stomach contents and urine of a European who was supposed to have died of poison. The man (twenty-eight years of age and of a rather powerful build) had been seen to add a quantity of spirit of wine to a *colourless* liquid in a tumbler, which he drank about 9·30 a.m. In a few minutes he became insensible, passing at once into a condition of profound coma, which continued until his death at 11 p.m.—thirteen hours after the supposed administration of the poison. The temperature of the body at 4 p.m. was 100°, 7.30 p.m. 103·6°, 9 p.m. 105° F.: the pupils were dilated. The requisition for the analysis to ascertain the cause of death contained the following passage—"from the evidence it seems doubtful whether the poison was belladonna or alcohol." As it is usual to find a *lowering* of temperature in cases of alcoholic poisoning, and as some of the *post-mortem* appearances were not consistent with the idea that death was caused by these means, the analysis was conducted with a view of finding a mydriatic poison. An alkaloid, indistinguishable from atropine, was detected in considerable quantity in both the contents of the stomach and bladder. In my official report on this case some stress was laid on the *impossibility* of distinguishing the mydriatic alkaloids of solanaceous plants in such cases as these; and the opinion was advanced that a solution of the alkaloid atropine had probably been employed. The Coroner referred my report to a medical man with a request that he would advise him as to what was the cause of death in English phraseology, and obtained the following reply:—"I consider the plain English of the analyst's report to be that Mr.—— died from a narcotic poison, and there is no doubt that the poison was *one of the preparations of Belladonna*." Now in this case not only was the analyst's report misinterpreted, but a statement was made which would not bear for one moment the light of modern scientific inquiry. The danger of trying to render in popular language opinions, in cases where the life of a fellow-creature may be at stake, is a most serious one; points in the evidence of a *circumstantial* character might be regarded by the jury as strictly *direct evidence*, and the gravest issues might result from an endeavour to avoid technicalities in a report where technical language cannot be safely dispensed with; in any case, the medical jurist who gave such an opinion as this, diametrically opposed as it is to a principle based on recognized matters of fact, would receive very severe handling at the hands of well-informed counsel.—W. E. C.

† *Pharm. Journ.*, [3], xv., p. 30.

‡ *Pharm. Journ.*, [3], xvii., 925.

§ Its alkaloidal character should of course be confirmed if there is sufficient material at the disposal of the operator.

‖ 'Therapeutics' (1880), p. 508.

during the course of some experiments made in the Government Laboratory with an alkaloidal extract of the flowers of *Datura alba*, considerable difficulty was experienced in killing a small guinea-pig with hypodermic injections of the base. Herbivorous animals are said to be but little affected by atropine, but it acts as a powerful poison on flesh-eaters.

'Med. Plants,' iii., 192; 'Flora Hongk.,' 245; 'Pharmacographia,' 462; 'Mat. Med. of W. India.' 518; 'Science Papers,' 258 and 266; *Pharm. Journ.*, [3], xvi., 497 and 540.

(*To be continued.*)

MEDICATED PLASTERS WITH RUBBER BASE.*

BY J. J. EDMONDSON, M.D.

A prominent teacher of pharmacy says: "Since the introduction of machine spread plasters, the preparation of a plaster by a pharmacist upon the prescription of a physician has become almost a lost art."

This is due largely to the fact that the incorporation of rubber with a plaster base has been kept as profound a secret as possible by manufacturers of plasters with rubber in the mass. Pharmacists have repeatedly tried to make a mass containing rubber, but so far have not been entirely successful.

The extensive use and success of plasters with rubber as against the old empl. plumbi, used so largely as a base for plasters, is due to:—

First.—As a mechanical support it adheres more firmly, does not move or slide, or change position.

Second.—Cleanliness.

Third.—Flexibility.

Fourth.—Does not decompose with age.

Pharmacists and physicians both prefer the plaster with rubber as a base, and yet neither have any accurate or practical idea of the way the mass is made, so that they are in a measure prescribing and dispensing secret preparations, for whose quality they have to take the word of the manufacturer.

Knowing that there has been a query before the Association for some time with regard to the making a plaster mass with rubber, and having a desire to advance the knowledge of the pharmacist, I have induced Mr. R. W. Johnson, of the firm of Johnson and Johnson, to give me the privilege of detailing the processes as used by him, after some thirteen years devoted entirely to the manufacture of this class of goods, with the hope that it may be of interest to the pharmacist, and a medium of enabling him when the spreading of a plaster is necessary on the prescription of a physician, to dispense an article that will be an improvement to the old plaster.

Even though it may not be practicable for the druggist to go through all the manipulations from the crude material, it may result in the development of a stock plaster mass that can be utilized when occasion requires the pharmacist to spread a plaster. Three ingredients are used for the making of a mass that will keep indefinitely, and which can be used to incorporate the various extracts or drugs intended for medicaters. These ingredients as employed by Mr. Johnson are rubber, 2 parts; burgundy pitch, 1 part; gum olibanum, 1 part. These may vary with some special plasters, but they constitute the component parts of the mass used for the majority of the plasters.

The crude rubber is at first steeped in hot water to cleanse and soften, then the rubber is passed through the washer and crusher, where it is subjected to severe pressure between two corrugated rolls, eight inches in diameter and one foot wide, while a stream of water falling continually washes it thoroughly, and it comes out in sheets somewhat softened.

After these sheets are dried, which requires a number of days, they are passed through what is called the grinder, where they are crushed between two smooth rolls, 14 inches in diameter and 36 inches across. This thoroughly softens the rubber and makes it plastic so that it can be readily worked up with the other gums. The principal operation, and one in which the greatest care must be exercised, then takes place, the mixing. At this point great skill, judgment and experience are necessary, so that the mixing shall be perfect, the medication carefully combined, and the whole manipulation so managed that the plaster will be of uniform quality, so that age or varying temperature shall not affect it.

This operation of mixing is done by means of rollers, 16 inches in diameter, arranged so that one revolves at twice the speed of the other. Through these same rollers the mass is passed with whatever medication is required, viz., when a belladonna mass is to be made, a certain amount of the stock mass is taken and of extract of belladonna in proportions corresponding to the formulæ in the Pharmacopœia. They are repeatedly passed through the rollers until the extract belladonna is thoroughly mixed with the mass, care being taken to keep the temperature from rising high enough to decompose or destroy the atropia. The spreading is also done by rollers, into which the thoroughly mixed mass is fed at the same time that the cloth is fed, the thickness of the plasters governed by screws on the side of the machine.

The rubber base is beyond question superior to the old mass of lead, resin, or wax for the great majority of plasters. It is pliable, adhesive, will not become too hard nor too soft, will yield up the medication to the absorbents of the skin, and will retain its properties indefinitely.

Neither the medical profession nor the pharmacist have given full credit to the value of the rubber base plaster; but this is the manufacturer's fault in keeping his processes a secret, thus subjecting his preparations to the suspicion that is naturally felt toward secret proprietary or semi-proprietary articles.

The uses of mass, with rubber as a base, are very large, so that if necessary ointments can be substituted for plasters, viz., oxide of zinc, which is so largely used in ointment form, can now be incorporated in the plaster, from 5 per cent. to 50 per cent., or more if necessary, without destroying the adhesiveness of the mass.

At the American Medical Association, at Chicago, Dr. John V. Shoemaker read a paper on the use of plasters, instead of ointments. I have here samples of the new combinations, with the amount of each ingredient labelled, which will serve to show to how great an extent this rubber base can be utilized, and the advantages of being able to apply most any medication desired, in a clean, effective manner.

Even if it should prove impracticable for a pharmacist to manipulate this rubber base for extemporaneous spreading of plasters, it is about time the pharmacist should be given some knowledge of the processes employed in their manufacture, because if the manufacturer claims officinality for his preparations in any degree, and on that ground asks the confidence of the druggist, it is but due the latter that he should have sufficient grounds in his own mind for according that confidence. It should not, and will not do for the maker of any article to say it contains so much of this alkaloid or that active principle. He should go further, and show how it is made and incorporated, and if he dare not do that, let him be content with a place with the manufacturer of other secret nostrums, and seek the proper channels for the creation and maintenance for a demand for his preparations, viz., the advertising column of the newspapers and the blank walls, instead of going to the physician and pharmacist, and claiming his goods are officinal, or pharmacopœial.

* From the 'Proceedings of the Pennsylvania Pharmaceutical Association,' 1887.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 15, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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PHARMACEUTICAL EDUCATION IN THE PROVINCES.

THE various attempts made from time to time to establish or resuscitate schools of pharmacy in the provinces, may be regarded as giving evidence that there is some sense of the want of educational opportunities such as the Council of the Pharmaceutical Society has long sought to establish. But unfortunately it is also evident that the sense of such a want is to a great extent only latent, and that there is not as yet any such general and combined effort to provide for its satisfaction as can be expected to effect all that is desirable in this respect. For years past there have been in one or other town throughout the country more or less well devised and enthusiastic efforts to provide apprentices with opportunities for studying the various scientific subjects with which it is essential that they should be practically acquainted, and it is highly creditable to those who have taken this work in hand that they should have manifested a readiness to be of service in this way. In the present number of the Journal will be found reports of the commencement of new sessions of two provincial schools, both of which have passed through various vicissitudes of success and depression, that at Newcastle, having being revived by the exertions of Mr. MARTIN, and that at Sheffield being now about to make a third attempt to achieve success. In the inaugural address delivered by the Presidents of the local Associations under whose auspices these schools are being carried on, it will be seen that there is a very decided expression of the opinion that the future welfare of pharmacy as an occupation imperatively demands careful attention to the education of those who are now in the position of apprentices. But in the case of the Newcastle school it has been found impossible to avoid the admission of disappointment that after two years' experience there does not appear to be any fair prospect of continuing its work under present conditions. With a feeling of considerable depression Mr. MARTIN finds himself compelled to confess the conviction is forced upon him that the registered chemists as a body do not believe in education, and consequently that nothing short of compulsion will be sufficient to make it sought for. Again in the history of the North of England Association we are told of the prospect of its collapse, and of the sacrifice of time and labour bestowed upon it.

At Sheffield the existing conditions are more favourable, and the numerous entries to the various classes present a promising feature. In the excellent address delivered by the President of the Local Association, the general character and requirements of the business upon which the students were entering were described in such a clear manner as to leave no room for doubt or uncertainty as to the mode in which their energies should be directed in order to obtain a competent knowledge of their calling, and to provide for their success in after life. It was shown that the practice of pharmacy offered opportunities for the exercise of the highest attainments without preventing any of its followers from aspiring to the highest social public or scientific position. Notwithstanding the unfavourable influences affecting this as well as most other occupations partaking of the nature of trade, it was pointed out that there is not necessarily any ground for apprehension on the part of those who are properly equipped for the work they have to do, but that on the contrary, there is reason for anticipating a brighter future for pharmacy under the influence of the sure and certain law which operates in favour of those who are as a body educated above their fellows. But the participation in such future advantages must depend upon the earnestness with which present opportunities for obtaining thoroughly efficient qualification are utilized during the period of apprenticeship, and it is in regard to this point that the influence of a fixed and definite course of study, which must be gone through, appears to be so desirable for the purpose of bringing home to the mind of pharmaceutical apprentices, at the very outset of their career, a full knowledge of what they must apply themselves to, and acquire a mastery of, before they can attain a position of qualification.

The failure of the Bill introduced during the last session of Parliament, for the purpose of establishing such an influence for the future benefit of pharmacy and its followers, was a great discouragement, but under the prevailing conditions of parliamentary affairs it was scarcely possible to hope for any better result. That it was felt to be a desirable measure by a great majority of members of parliament may be taken as certain, and that the need for such a measure is appreciated by the pharmaceutical community may, we think, be recognized in the fact that in so many parts of the country spontaneous efforts are being made to promote, in a partial way, the objects which the Bill was intended to secure more generally. The presence of the President of the Pharmaceutical Society at the opening of the Sheffield School, last Wednesday, gave him an opportunity of expressing the desire of the Council to continue its endeavour to obtain such a measure,

and also of pointing out how necessary it will be for members of the trade to support the Executive in its future attempts in that direction. The remarks made by Mr. CUBLEY, in proposing the toast of the Pharmaceutical Society, as well as those in which Mr. FURNESS pointed out the importance of the Society as a representative body, and the services it had rendered to the class it represents, furnish ground for satisfaction by their contrast to the unreasonable discontent and antipathy that is sometimes manifested. We feel convinced that they are by no means singular in entertaining such views as they expressed on that occasion; but there are many, who, agreeing with them in opinion, fail to give effect to their convictions by actively supporting the Society's executive, so as to contribute towards making it powerful for good, powerful for propulsion, and able to command the respect of influential persons. The visit of the President to Sheffield shows that if it be the case that there is too much reason for complaining of the apathy with which the work of the Society's executive is regarded, it may also be taken as certain that such a feeling may often be reduced, or even converted into active co-operation, by personal intercourse and discussion. The great point to aim at is to obtain a recognition of the fact that the Society must necessarily exercise a great influence in all matters connected with the trade, and that its power to benefit must always be proportionate to the support afforded to it by the majority. Whatever deficiences are now to be recognized may be traced, as the President pointed out, to opposition which has been offered by the trade, or a portion of it, to the measures which the Society has endeavoured to carry through, and above all things it must be remembered that, but for such opposition, the pharmaceutical body might have long since been endowed with the exclusive privilege of dealing in official drugs and pharmaceutical preparations, which Dr. GREENHOW recently spoke of as being not only proper in the nature of things, but also desirable in the interests of the public.

A correspondent, writing in reference to the sale of potassium cyanide by vendors of photographic apparatus, without even labelling it "poison," asks whether such sale is legal, as it has been suggested to him that there appears to be some laxity of the law in this respect. The point to be considered in regard to this matter is whether such a sale is really a wholesale transaction or merely a retail sale. In the former case it would be legal as coming within the exemptions provided for by section 16 of the Pharmacy Act, though the article would still require to be labelled "Poison." But if it were a retail sale, and the transaction were not registered and the packet did not bear a label having on it the word "poison" and the name and address of the seller, it would be illegal, and an infringement of the 17th section of the Act, for which the seller would be liable to prosecution as provided by that section. It is competent for any person or for the police authorities to institute such prosecution for the illegal sale of poison, and if the vendor were a person not registered under the Pharmacy Act, 1868, he would be liable to a further prosecution by the officers of the Pharmaceutical Society for having infringed the 1st and 15th sections of the Act. We think our correspondent is mistaken in thinking that the administration of the law is "partial, erratic and unfair;" any laxity there may be is the fault of the public in not making use of the power afforded by the Act. The same remarks will apply to the sale of poisons for destroying moths, etc., by naturalists and others.

* * *

An American contemporary in speaking of the lately developed tendency to local organization among pharmacists, approves of it as meaning not merely the outside influence of the few over the many, but the personal association of those who have the most direct interest in all that concerns their mutual well being. The exchange of views thus obtained, the knowledge of improved modes and methods thus disseminated, and, above all, the breaking down of the estrangement which has been a prolific source of antagonism is gradually effecting a unity of purpose, developing a higher status, and creating for pharmacy more consolidation and a better appreciation of the arts and sciences pertaining thereto. Our American colleagues are somewhat in advance of ourselves in this respect, but their experience is encouraging, and may serve to stimulate imitation with equally advantageous results.

* * *

We have been favoured with an early copy of the Proceedings of the Chemists' Assistants' Association, containing papers and abstracts of papers read at the meeting of the Association during the session 1886–1887, together with a list of the officers and members, and the rules, forming altogether a neatly printed little *brochure* of about one hundred pages. Although most of the papers have already been reported more or less fully in this Journal, they are as a rule well worthy of being reprinted in a collected form, and the Council of the Association may be complimented upon its enterprise in placing at the disposal of its members and friends so creditable an official record of its proceedings.

* * *

An official permanent Pharmacopœia Commission has just been appointed in Germany, to act in conjunction with the Imperial Board of Health in the editing of the Pharmacopœa Germanica up to the end of the year 1891, when the time for the publication of the next edition of that work will have arrived. The members of the Commission are Dr. Gerhardt, Professor of Medicine, Berlin; Dr. Binz, Professor of Pharmacology, Bonn; Dr. Schmidt, Professor of Chemistry and Pharmacy, Marburg; Dr. Jaffé, Professor of Pharmacology, Königsberg; Dr. Schacht, pharmacist, and Member of the Royal Technical Commisson for Pharmaceutical Affairs, Berlin; Dr. Hilger, Professor of Applied Chemistry and Pharmacy, Erlangen; Dr. Merkel, Member of the Bavarian Royal Medical Council, Nuremberg; Dr. Fiedler, Member of the Saxony Royal Medical Council, Dresden; Dr. Bruns, Professor of Medicine, Tübingen; Dr. Vulpius, Superintendent-Pharmacist in the Academy Hospital, Heidelberg; Senator Dr. Brunnengräber, University Pharmacist, Rostock; and Professor Dr. Flückiger, Strassburg.

* * *

A meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, on Thursday evening next, at 9 p.m., when a paper on "Recent Researches in Botany" will be read by Mr. E. G. Baker, F.L.S.

Pharmaceutical Society of Ireland.

ANNUAL MEETING.

On Monday, the 3rd instant, the annual general meeting of the members of this Society was held. There was a moderately large attendance.

The chair was taken by the outgoing President, Mr. William N. Allen.

The minutes of the last meeting were read and confirmed.

The President said that in consequence of the resignation of Dr. Aquilla Smith he had to declare the outgoing five members of the Council, together with Mr. George L. McCormack, the only new member nominated, to be elected for the ensuing three years; consequently there was no occasion to appoint scrutineers. He was glad to be able to congratulate the Society on an increase of ten in the number of their paying members during the past year. At the preliminary examinations, 42 had been examined, of whom 24 passed, as against 40 examined in the previous year, of whom 21 passed; and for the license 40 had been examined, being an increase of 10 over the preceding year. The percentage of failures had been 50 per cent. In the Pharmaceutical Society of Great Britain the proportion of rejections at the qualifying examinations during the same period was 57·7. The examinations of their (the Irish) Society had been conducted by the same examiners as before, and in the same satisfactory manner; but he regretted the non-appointment at the last annual meeting of a visiting committee, and also the apathy of members of the Council as regarded attendance at the examinations. In consequence of the important reports of Dr. Duffey to the Privy Council, two of which had been considered during the past year, it was the more necessary that the Council should be correctly informed as to what passed at the examinations through the personal observation of the members, in order that they might be the better able to frame replies to the Privy Council. Anyone who had read the replies which had been given, must have found in them a complete answer to the complaints which had been made in some quarters against the examinations. The refusal of Sir Michael Hicks Beach to receive a deputation from the Council formed an unpleasant episode in the history of their past year. It was apparent that their hopes for the future must in a great measure lie in themselves. In order to gain the confidence of the public, competent knowledge and technical skill would alone aid them; and therefore it was the more important that the Society's standard of capability should be kept up. He was glad to have to notice that successful prosecutions had taken place in Navan and other places in County Meath; on the other hand the recent failures in Dublin and Belfast were much to be regretted. Mr. Hodgson, the Treasurer, would now submit his report for the year.

Mr. Hodgson said the statement which he had now to submit was a little more favourable than that of last year. They commenced the year with a balance in hand of £92 1*s.* 1*d.*, and they were ending it with a balance in bank of £126 17*s.* 10*d.* In fees for the license examinations £131 5*s.* had been received as against £147 in 1886. They had received in fees for the preliminary examinations £94 10*s.* in 1886 as against £98 14*s.* in the present year; and he was happy to add that they had received in subscriptions £19 19*s.* more than they did in 1886, the amounts being £55 13*s.* for fifty-three subscriptions in 1886, and £75 12*s.* for seventy-two subscriptions this year. For prosecutions they had received from members of the Society subscriptions to the amount of £25; otherwise the balance would have been seriously against them, as they had spent £38 14*s.* 8*d.* in prosecutions. But as they had received a total of £39 1*s.* 4*d.* in connection with prosecutions, the balance was the other way. The payments had been very much as in the year before. They had paid £86 2*s.* for examiners' fees, as against £73 10*s.* in the preceding year. They had spent £25 8*s.* 7*d.* in furniture, but that outlay would not occur again, and the value of it was in the premises; while he was not aware that there was anything due, with the exception of a small item for plumbing. So that although they had had an increased expenditure their balance in hand was larger than last year, and adding £248 3*s.* 1*d.* invested in 3 per cent. stock the total amounted to £375 0*s.* 11*d.* to their credit. Still he wished that balance were larger, for his ambition had always been—and he was sure it was shared by every member of the Council—to get the Society into a position to have premises of their own. In order to assist towards the attainment of that end he would be ready, when the proper time came—and he was sure others would also—to put his hand into his pocket. If they had a house of their own they could appropriate parts of it for a laboratory, chemical lecture room, and in a variety of other ways for the advantage and development of pharmacy. The account which he handed in had been vouched, and was, he believed, perfectly correct.

Mr. J. T. Holmes moved the adoption of the Treasurer's report.

Mr. Grindley seconded the motion, which was unanimously agreed to.

The President said the next business was the election of officers. He himself did not seek re-election as President.

Mr. Grindley said he had great pleasure in moving that Mr. J. E. Brunker be their President for the ensuing year. No member of the Council or of the Society was more competent for the office, inasmuch as he was thoroughly conversant with the Act of Parliament, and had had long experience as President. He did not think he need enlarge on his merits and capabilities, as they were all fully aware of them.

The Vice-President, Mr. Draper, said he seconded the motion with all his heart. Mr. Brunker had had a long experience of the Presidency, and he (Mr. Draper) had worked happily and comfortably with him during the entire time; and he was sure that no better President had ever sat at that table. Still he could not second the motion with unalloyed pleasure; for he could not do so without a feeling of regret that Mr. Allen, after one brief year of office, should have found it necessary to resign, and he was sure a great many others had endeavoured to induce Mr. Allen to hold office for another year; but as that gentleman, from his engagements, had felt it absolutely necessary to resign he did not continue the pressure. He need not add a word to what had been said in favour of Mr. Brunker's candidature. No one was more familiar with the business, or more urbane and genial to them all.

Mr. Downes said there were a large number of original members of the Society still with them who were competent to fill the chair with credit. There was Sir George Owens, whom he would be very happy to see in the chair; and there were Dr. Collins and Dr. Montgomery, both passed Governors of the Apothecaries' Hall. He did not see why they should turn their backs on those gentlemen. Then there was their Treasurer, Mr. Hodgson, who had served in that office for twelve years, and who had been very active and attentive. He moved an amendment that Mr. Hodgson be elected President.

Mr. Merrin said he had great pleasure in seconding the amendment.

Mr. Hodgson said he felt very much indebted to Mr. Downes for his kindness in bringing his name forward, and also to the gentleman who had seconded the proposal; but if the honour of election to the office of President were bestowed upon him, he should be obliged to decline it. His hands were so full of other engagements, and he had so much business of his own to attend to, that it would be utterly impossible for him to do the justice to

the office that he should wish. Last year he proposed his friend Mr. Brunker for the office, but there was a technical difficulty in the way, for the removal of which no notice of motion had been given. He was very glad that Mr. Brunker was proposed now, knowing how he had given his time and talents to the office on former occasions.

Dr. Collins said he felt very much obliged to his friend who had mentioned his name and those of others connected with the Apothecaries' Hall; but Mr. Brunker was in his opinion the best man they could possibly have as President. Even if they did him (Dr. Collins) the honour of electing him, he had so many other matters to attend to that he did not think he could accept the office, no matter how thankful he might be for the honour of election.

The motion for the election of Mr. Brunker was then put, and carried unanimously.

Mr. Brunker then took the chair amid applause as President, and said it was with a considerable degree of regret that he again occupied the chair. He had hoped that Mr. Allen would continue in the office that he had so ably filled during the past year. He knew from experience the amount of work that the President had to do; and he also knew that it had been by no means less than in former years, during Mr. Allen's year of office, and that he had devoted an enormous amount of time and attention to the interests of the Society. The attention that he had paid to the examinations, and to other difficult matters during the past year, showed that he was well worthy to fill the chair for many a year to come. He therefore regretted very much that Mr. Allen had expressed a determination not to continue in the chair; and as for himself he could not resist the pressure which had been so strongly brought to bear on him. The office was not a light one at the present moment; and he knew from the signs about them that during the coming year a great deal would have to be done. He begged to thank them for the honour they had done him in again electing him to the office.

Mr. Hodgson moved that Mr. Draper be re-elected Vice-President. He did not think the office could possibly be in better hands. Mr. Draper had great experience, judgment, and tact.

Mr. Allen seconded the motion with great pleasure. During the past year he had been in office with Mr. Draper, and he could testify to the uniform courtesy and kindness which he experienced from him whenever—which was very frequently—he had occasion to call on him relative to the affairs of the Society.

The motion was carried unanimously.

The President (Mr. Brunker) said he had great pleasure in declaring Mr. Draper re-elected Vice-President. He had worked with him for many years, and knew his value; and he was extremely obliged to the Society for giving him so able and kindly a colleague.

The Vice-President, in returning thanks, said the kindness he had received was one that he neither expected nor deserved. He would have very much preferred that one of the many gentlemen around him had taken the office; however, he felt the honour of being elected to it, although it was one in which there was very little to do. He had also to thank Mr. Hodgson for his kind observations.

Mr. Hayes said it had fallen to his lot during the last twelve years to propose at each annual meeting the re-election of Mr. Hodgson as Treasurer. He had done his work thoroughly well during that period, and had kept the accounts in a most admirable manner. They owed him a debt of gratitude for all the trouble he had taken in a thankless office.

Mr. Downes rose to a point of order. It appeared to him that this and other offices should be filled up by the Council, and not at the general meeting.

The President said that under the Bye-laws which had been sanctioned by the Lord Lieutenant and Privy Council, provision was made for the election of the "officers" at the "annual meeting." This had been done for the last twelve years; and following that precedent he must rule against Mr. Downes.

Mr. Simpson said he had much pleasure in seconding the motion for the re-election of Mr. Hodgson.

The motion was agreed to unanimously, and

Mr. Hodgson said he was very much obliged to them for re-electing him. He had discharged his duties to the best of his ability, and with the object of conserving their funds, so that eventually they might be able to have a place of their own.

Dr. Collins said he had great pleasure in moving that the thanks of the Society be given to Mr. Allen for the able manner in which he had discharged the duties of President during the past year. He knew of his own knowledge that Mr. Allen had discharged those duties in a most admirable manner. A great deal of important correspondence in connection with the Society devolved on the President; and much time, ability, and care were required to conduct it in a suitable manner. All this Mr. Allen had done in a manner for which they ought to be very thankful.

Mr. Wells said he had great pleasure in seconding this vote of thanks. He could bear out all that Dr. Collins had said as to the way in which Mr. Allen had discharged his duties. He had come into contact with him on committees during the year, and he knew the great amount of time and attention that he gave to the work of the Society.

The motion was unanimously carried.

Mr. Allen said he felt very deeply the kind manner in which the vote had been passed; and he also felt personally indebted to Dr. Collins for the kind way in which he had spoken of him. In everything that he had done during the past year he had been animated by but one idea, namely the good of the Society. He trusted that any shortcomings on his part would be overlooked; and he begged to thank his friends who had supported him during a sometimes troublesome and trying time.

On the motion of Mr. Allen, seconded by Mr. Holmes, Messrs. Hayes and Simpson were re-elected Auditors.

Mr. Hodgson moved that Mr. Ferrall be re-elected Registrar. He had been continually in contact with him, and could vouch for the extreme accuracy with which his work was done in connection with the accounts. Everything was most accurate and carefully done. According to his experience the appointment of Mr. Ferrall was a very good one.

Dr. Montgomery said he felt great pleasure in seconding the motion. The appointment of Mr. Ferrall was one that had given satisfaction to them all.

The President, in putting the motion, said that according to his experience they had got in Mr. Ferrall a very satisfactory officer indeed.

Passed unanimously.

Mr. Ferrall, in responding, said that as long as he should be there he would endeavour to discharge his duties in such a way as to merit the confidence of the Society.

On the motion of Mr. Beggs, seconded by Mr. Simpson, the Law Committee were re-elected, the name of Mr. Allen being substituted for that of Mr. Brunker.

On the motion of Mr. Grindley, seconded by Mr. Evans, the Certificates Committee were re-elected, with the substitution of Mr. Allen for Mr. Brunker.

The President said that last year the Committee to attend at examinations were not reappointed, and that duty was left to the twenty-one members of the Council in the hope that it would be more effectually performed. The number of members of the Council who did attend the examinations, however, was very much smaller than had been expected. It was a matter of the greatest importance that the Council should be thoroughly acquainted with the way in which the examinations were conducted, in order that they might be in a position to

answer any remarks or comments that were afterwards made by candidates. He therefore thought it might be well to reappoint the Committee.

Mr. Ferrall mentioned that he had sent invitations to the number of members of the Council on the rotation list, to attend the next examinations.

The President said in that case perhaps they had better try the existing arrangement for another year.

Mr. Allen moved pursuant to notice that in future the attendances of each member of the Council on Committees during the year, be given in the papers for the election of the Council. He thought this a matter of simple justice to the members who did attend the Committees. During his year of office he attended nineteen committee meetings, besides attending at examinations.

Mr. Wells seconded the motion.

Mr. Downes moved an amendment that the matter be referred to the Council.

Professor Tichborne said that any return of this sort should be made in such a way as not to do injustice to members of the Council who were not on Committees.

Mr. Allen said his intention was that there should be separate schedules for the attendances of both classes.

Mr. Hayes seconded the amendment.

Dr. Montgomery said he did not see the use of this proposal, and he thought it would have been as well not to put it to the meeting at all.

The amendment was carried by 9 votes to 8.

Mr. Downes moved that the Council be requested to appoint another solicitor. The Society had lost prestige through the failure of recent prosecutions in Dublin and Belfast.

The motion was not seconded.

The President said the Society had a solicitor who on former occasions had conducted their business in Dublin with success. In reference to another matter he wished to clear away some misconceptions. The Council had no power to create a second grade of licentiates, consisting of chemists or druggists, who would be entitled to sell poisons but not to compound prescriptions. This would appear on a reference to the preamble of their Act, which stated that "a great deficiency existed through Ireland of establishments and shops for the sale of medicines and compounding of prescriptions," and that it was "expedient that provision should be made for the formation of a Pharmaceutical Society and for the examinations of persons desiring to keep open shop for the purposes aforesaid, and for the registration of such of the said persons as may be found on examination to possess a competent practical knowledge of pharmaceutical and general chemistry, and other branches of useful knowledge, as fit persons to keep open shop for the dispensing and compounding of prescriptions of duly qualified medical practitioners." So that the Council were only authorized to license persons who would be qualified to dispense medical prescriptions. The acceptance of a grade styled chemists and druggists would (under their Act) lead to the foundation of two sets of men having equal rights as regards their dealings with the public, and only differing in the severity of the examination which they had passed. The Council of the day wisely decided under their powers in having only one grade. No doubt some persons thought it was a pity that the Council had not power to qualify an inferior grade who could sell poisons without being competent to exercise the other functions of a pharmaceutical chemist, but to obtain such power legislation would be necessary. That time last year he expressed a hope that they would have had some legislation during the year, but Sir Michael Hicks-Beach disappointed them, declining to receive a deputation from the Society, and suggesting that what they wanted should be done by a private member of Parliament. They had seen that a member of the House of Lords had evinced a great interest in the matter, and he (the President) intended to ascertain from his lordship whether he was inclined to take up the question of the amendment of the Pharmacy Act of Ireland. At the same time gentlemen should remember that if they went to Parliament they could not expect to have everything their own way. They should be prepared to encounter opposing interests.

Mr. Hodgson expressed regret that a power of registering all those persons who were in business prior to the passing of the Act and who were protected by it had not been secured to the Council. Now they were in a state of chaos. If they prosecuted a person for selling poisons without being entitled to do so they generally found it very hard to prove that he was not in business before the passing of the Act.

Professor Tichborne remarked that six years ago they nearly succeeded in putting that matter right; but owing to the political unrest and changes of Government it dropped through.

Mr. Hayes said that if members had attended in court during one of the prosecutions referred to they would have been able to assist the solicitor.

The motion of Mr. Downes not being seconded fell to the ground.

The proceedings then terminated.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 5th instant.

Present—The President, Mr. J. E. Brunker, M.A., in the chair. The Vice-President (Mr. Draper), Mr. W. Allen (ex-President), Sir George Owens, Dr. Collins, Messrs. McCormack, Beggs, Wells, Charles Evans, Grindley, Hodgson (Treasurer), and Dr. Montgomery.

A letter had been received from Mr. Alexander C. Doran, thanking the Council for their letter expressing sympathy with him in his recent domestic bereavement.

A letter dated September 20 from Mr. W. T. Neville, Acting Clerk of the Privy Council, was received, in reference to a resolution passed by the Council on April 6 last, and a rider subsequently suggested to be added to it. The resolution was as follows:—"Any candidate who presents himself for examination, and shall receive an examination paper in due course from the examiner, shall be regarded as a rejected candidate if he does not attend the examinations throughout." The rider was—"Unless before retiring he shall have made the necessary number of marks to satisfy the examiner." The letter stated that the law officers of the Crown had made the following observations upon the rider:—"The amendment suggested partly removes the apparent hardship already pointed out, but it does not apply to the case of a candidate who before making the number of marks is temporarily compelled to leave. 'Number of marks' appears in the amendment to mean number on all the papers and subjects, and not merely the number on the particular paper. Is this intended?"

The President: The law officers do not appear to have grasped what the intention of the proposed bye-law is. It did not refer to a temporary retirement of a candidate from examination at all, but to his total withdrawal after having come in on the first day.

Dr. Collins: Does it provide for the case of a young man getting ill and being obliged to withdraw after having gone through half of his examination? Would no allowance be made for him?

The President: That is evidently the case that the law officers have in view.

Mr. Wells: If a man were to withdraw after two days, and did not appear again, even though it was from illness, would we have power to allow him to come up again after three months?

Mr. Allen: We have done so.

Mr. Wells said that in a case in which that was done it turned out that there had been an abuse. The young man withdrew stating that he was ill, and he was

allowed to come in for examination again at the end of three months. Afterwards, when his marks in the first examination were investigated, it was found that he would have been plucked even though he had remained.

The President: The objection of the law officers is that under the rider suggested a candidate, who, after having passed part of his examination, should be obliged to retire in consequence of indisposition, would not be able to come up again for six months.

Dr. Collins: The same thing occurred to my mind, namely, that you should make some provision for illness. Of course a man might pretend illness, but there will not be very many such cases, I fancy.

Dr. Collins then moved—

"That the following be an additional rider to the resolution of April 1: 'or unless his absence shall be occasioned by illness certified by a medical certificate.'"

The Vice-President seconded the motion, which was unanimously agreed to.

Mr. Wells: An explanation should be given to the law officers of the Crown as well.

The President: Yes, I undertake to draft a letter.

A letter from the Acting Clerk of the Privy Council enclosed an Order in Council approving of the temporary appointment of Dr. J. W. Moore as examiner at the Preliminary examination, during the absence of Dr. H. C. Tweedy.

A donation was reported from the Mason Science College of their calendar for 1887–1888.

A report from the Certificates Committee was submitted.

The President said it appeared from one of the certificates, that a candidate had attended twenty-three out of thirty working days in a period of three months.

Mr. Wells: Has our resolution requiring one hundred working hours in three months been passed by the Privy Council yet?

The President: It is before them, along with other resolutions.

On the motion of Mr. Hodgson, seconded by Mr. Beggs, a report of the Law Committee was adopted.

Mr. John Joseph Sewell of Killarney was, on the motion of Mr. Allen, seconded by the President, admitted a member of the Society.

The President: I intend to write to the Earl of Miltown at once, and ascertain from him whether he can do anything for us. He may be passing through town, and may give me a personal interview.

Some financial business having been disposed of the Council adjourned.

OCTOBER EXAMINATION.

At the PRELIMINARY EXAMINATION on Monday, Oct. 3, the following persons passed:—

Armour, Richard, 13, Canal Street, Newry.
Devlin, Peter John, the Medical Hall, Lismore.
Herriott, David, 19, Castle Street, Sligo.
M'Grath, James, 2, Dublin Street, Carlow.
Shanks, John Bailey, High Street, Holywood.
Wallace, John, 59, Antrim Road, Belfast.

At the LICENSE EXAMINATION, on Wednesday, Thursday and Friday, September 5, 6 and 7, the following persons passed:—

Allan, Alexander Ferguson, 29, Heytesbury Street, Dublin.
Maxwell, Robert Wagner, 7, Longwood Avenue, Dublin.
Robb, Samuel, 8, Cavendish Row, Dublin.
Robinson, John Simpson, 9, Duggan Place, Rathmines.
Rousselle, Robert Joseph, 107, Grafton Street, Dublin.
Walker, Edward, 3, Lower Sackville Street, Dublin.

Provincial Transactions.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

The annual meeting was held in the Council Room of the Mining Institute, Newcastle-on-Tyne, on Thursday, October 6. Mr. N. H. Martin, F.L.S., etc., President, in the chair.

The minutes of the last general meeting were read by the Hon. Sec., Mr. Ford, and confirmed.

The report of the Council was also read, in which it was stated that the Association now numbers 75 members and 61 associates, and that the library contains 185 volumes. Five students attended the chemistry classes, and ten each the botany and pharmacy and materia medica classes. As the result of the examinations at the end of the session the prize in chemistry was awarded to Mr. John Adamson; botany, Mr. R. W. Maillard; pharmacy and materia medica, Mr. H. Spargo. An extra prize in materia medica was given by Mr. Watson, and awarded to Mr. R. W. Maillard.

The Treasurer's report was read by Mr. Thomas Rheeder, Hon. Treas., showing the Association indebted to the Treasurer a few pounds, but that several members and associates had not yet paid their subscriptions.

The President moved the adoption of the report, which was seconded by Mr. Clague.

In the discussion which followed the reading of the reports, Mr. B. S. Proctor, Vice-President, proposed, and Mr. Geo. Foggan seconded, the following motion:—"That it be a direction to the incoming Council to at once reduce the expenditure by giving up the rooms rented by the Association."

Mr. John Harrison, Vice-President, proposed as an amendment, "That the question of the advisability of giving up the rooms be left to the incoming Council to decide, and that immediate steps be taken to increase the membership."

Mr. T. M. Clague seconded the amendment, as he thought it fully met the motion of Mr. Proctor; at the same time he felt the prospect of obtaining an addition to the list of members and associates was not a very hopeful one on which to rely.

The amendment having been put to the meeting was declared carried.

The lecturers gave a report of their respective classes, and alluded to the good work done by some of the students, and Professor Bedson especially mentioned the excellent work done by two of the students in the chemistry class. Professor Bedson went on to say, "these facts warrant the hope that the Association will continue its missionary efforts, which will in time be rewarded by a larger proportion of the hard-working and industrious students amongst those who make the personal sacrifice to enable them to benefit by the opportunities the Association brings within their reach."

The prizes were then distributed by Mr. John Harrison, with appropriate remarks.

The President (Mr. N. H. MARTIN) then delivered—

THE ANNUAL ADDRESS.

Gentlemen,—It has been with a feeling of considerable depression that I have contemplated the duty which by your rules is laid upon me to-night, and I have endeavoured to discover and analyse the cause. It is not in the least that I have lost faith in the efficacy of what I believe to be the remedy for the ills which confront the chemists and druggists of this country, or that I doubt that the machinery of this Association might not be made a factor to accomplish a useful purpose. No, the depression arises from the conviction forced upon me by the past two years' experience, that the registered chemists as a body do not believe in education, and do not want it, and that nothing short of compulsion will make them seek it. When I think of all that has been said

and written upon the advantages of education, how the pages of the *Pharmaceutical Journal* have for forty years and more teemed with advice on the subject, I cannot but reflect that the probability of my being able to say anything which may in the least degree help to arouse chemists from their lethargy is remote indeed! Under these circumstances I should much have preferred to remain silent; but as it is from no choice of mine I must speak, I must once again tell you something of my opinions. The reports which have been read in your hearing tell you in language more eloquent than I can use that the interest which was aroused two years ago by the anticipation of the curriculum has considerably diminished, and that there is danger of its dwindling to such a point that our Association will collapse, and the labour and money which have already been spent be sacrificed. This will be a disappointment to some of us who have laboured on behalf of the Association, and by no one will the grief be more keenly felt than by myself; but if it must and does come to pass, that in this North of England there is so little faith in a better education for the pharmacist that it is not worth the effort to support a local school of pharmacy, I have no doubt we shall in time get over our disappointment and grief.

Last year I alluded to the unsatisfactory condition of our business; to-day the evils are accentuated, and a condition of affairs is being brought about that will make our registration simply meaningless. In two recent legal decisions it has been decided that a *corporation* is not a *person* under the meaning of the Pharmacy Act, and that such a corporation, if it employs a registered individual to sell and dispense poisons, is exempt from its provisions. One cannot avoid asking, Is it likely that those who framed the Act of 1868, and were careful to lay down with so much precision the conditions for selling poisons, would, in the interest of the public, have neglected to provide that any company who might thereafter sell poisons should employ a registered assistant? As no such provision is made, and the company may from time to time have in its employ either qualified or unqualified assistants, I think the inference is fair that Parliament never contemplated companies performing the functions of chemists and druggists. These decisions cannot fail to have a potent influence upon the distribution of drugs in this country in the future, and already we hear of a number of limited liability companies starting in all directions, and of something very like a panic possessing legitimate chemists and druggists. It would be easy, and perhaps not altogether unprofitable, to trace how step by step those upon whom was conferred the privilege of registration under the Pharmacy Act have neglected their opportunities to become educated, and have failed to influence the public to demand careful and intelligent service in the distribution of drugs by lending themselves to the distribution of quack medicines. The things themselves bore a good profit, and there was no labour, not even to think, in handling the pills of others. Printed matter was poured in upon the chemist, and his name, without a farthing of expense to himself, was a household word as the *agent* of "Old Parr." Moreover, the things sold like "hot cross buns," and the 1*s.* 1½*d.*, 2*s.* 9*d.* and 4*s.* 6*d.* told up a goodly sum in the day's return. The weak point was, and is, that anybody else could sell "hot cross buns," or "Old Parr's Pills," and sell them a farthing or three pence cheaper than he could do. It does not need education, or special training, or high moral character, to dispense such wares, and so it was no wonder that men who wanted a bait to trap customers, and did not desire to sell their own goods without a profit, should seize upon things possessing such great advantages for their purpose as patent medicines. And so it went on from one step to another until these vendors of patent medicines have found the means of driving the proverbial coach and four through our Pharmacy Act. Two courses are now open to us: the one is to endeavour to fight these interlopers with their own weapons, and thereby confess that we were, and are, unworthy of the privileges conferred upon us by the Pharmacy Act, and to demand from our fellow countrymen the reward we have hitherto expected for our services. The other is to look the situation sternly in the face, to realize the fact that a serious breach is made in our walls, and that if we are to hold our own and retain, or, I might almost say, regain the confidence of the medical men and the public, no time is to be lost in setting our house in order. If, as a body, we adopt the first course there must very soon come the survival of the fittest in the person of the capitalist. The large capitalist is the only one who can *honestly* compete with the prices at which co-operative societies may choose to sell drugs, and for most chemists and druggists with the amount of capital in money which has hitherto been sufficient to carry on a retail business, it must be only a more or less prolonged struggle, but their final extinction is certain. I do not yet believe, however, that our countrymen will prefer to be dosed with drugs by the pound or the ton simply because the drugs are cheap as well as nasty, but that their choice in the future will be, as in the past, to prefer to pay the chemist who has inspired in them confidence in his skill and ability for the single dose, rather than purchase a dozen doses from a man whose only claim upon their notice is that he sells physic cheap. For this reason I am convinced that if the distribution of drugs leaves the registered chemists and druggists to be taken up by capitalists and companies, it will be as a consequence, and only as a consequence, of the former having neglected to qualify themselves, by education and superior training, to influence their customers and the public to come to them and ungrudgingly pay them a suitable reward for honest and faithful service.

I said just now we should begin in sober earnest to put our house in order. There are two directions in which this is to be done, by education and by political action. I place them, and will consider them, in the order of their importance. At the present time there is probably no word so frequently on men's lips, and no subject which occupies so large a share of their thoughts, as education. We have been told, *ad nauseam*, that whatever position of equality or supremacy we have gained amongst the nations of the world is being seriously imperilled by the superior education of other nations. I do not stay to enquire into the accuracy of this statement, but will, if you please, take it for granted. Before I proceed, however, to consider education in its relation to pharmacy, I should like to say one word upon the general subject. If we study the demands of the people, and observe how those who should be teachers and pioneers of learning respond to their appeals, it will be seen there is a great danger that in our eagerness to supply the education which is giving other countries advantages, we make our English people "Jacks of all trades, and Masters of none." There is at the present moment a rage for "useful knowledge," the word useful being taken to mean something which at an early period can be converted into money. Hence, we have our evening classes and popular lectures, by which men are led to think that subjects which are worthy the whole powers of mind and body for no inconsiderable part of a man's life, can be studied and learnt in the dregs of time after men have given the best of their powers to commerce or toil. Such practices have produced an impatience of prolonged study, and we see colleges and schools, instead of insisting that education (which is the art of cultivating and developing the physical, intellectual, and moral faculties of men, and is of necessity a slow and gradual process) must to be successful have time, cut down their schemes of education to the barest possible limit that the mind can perform certain gymnastic exercises in the subjects taught called "passing the examination." I say all this has a most pernicious effect on real and thorough education, and will have but a very small influence in enabling England to hold her own in the race

of nations. England had a Nelson and a Wellington, a Faraday, a Dalton and a Turner long before this craze for universal knowledge seized everybody, and if she still can boast of a General Roberts, a Roscoe, an Armstrong and a Ruskin, it is because there are men who have not come under the influence of modern views, or who in spite of them concentrate the best powers of mind and body in the prosecution of some one subject worthy of such devotion. But enough of this. A longer time than I can spare would not do justice to the subject. I only refer to it because the same spirit prevails in pharmaceutical education, and is the chief factor in its failure.

I will pass over the education considered necessary for the Preliminary examination, and content myself with remarking that, meagre as is the total amount of information in classics and mathematics which is demanded from the student, the examiners appear to use an exceedingly open sieve, and to pass through it young men to whom it would be a positive kindness to suggest they were taking a wrong step in devoting their limited capacities and attainments to the pursuit of the sciences essential to produce a pharmacist.

I will at once pass on to the means provided for education in the technical subjects of pharmacy, and, as members of the Pharmaceutical Society, we may not be considered unreasonable if we turn to the syllabus of our own School of Pharmacy at Bloomsbury Square, and question as to how far that fulfils, or comes short of, our ideal. This will possess the greater interest for us, because there have within recent years been changes in connection with the methods and the *personnel* of teaching which we shall find of interest. Two such honoured names as Redwood and Bentley have disappeared from the active teaching staff, although happily the individuals are still amongst us, and it is to be hoped their ripe experience and wisdom may be available to counsel and advise the younger generation.

It will be remembered by some of us who studied at Bloomsbury Square, that under the old regime the session extended over the ten months from October to July, and that the lecturer on chemistry, whilst he expounded the doctrines and principles of his Science, taught and illustrated many of their practical applications in pharmacy; and the lecturer on botany applied the teachings of that science to the education of his students in a knowledge of that all important subject, materia medica. But *tempora mutantur, et nos mutamur in illis*, and when we come to study the latest syllabus of the School of Pharmacy of the Pharmaceutical Society of Great Britain we find the session is cut down to five months. Let us take the subjects as they are detailed in the list, and inquire into the effect of this change. The first subject is chemistry, and after carefully reading the schedule of Professor Dunstan's lectures on pages five and six, I am bound to say that, without in the least degree doubting the Professor's ability to compress into the time from October to February all that is there stated, I do most emphatically question whether his best student can do justice to such a course in the time allotted. And ought the amount of work to be accomplished to be adapted to the capacity of the brilliant student or to the average one? It is true we are told in the introductory paragraphs, that the course is repeated from March to July, and that the experimental illustrations in the second course differ from those in the first to such an extent as to make the second course valuable, and I presume desirable, on the part of the student; although, how this latter statement can be quite reconciled with the fact specifically mentioned that each course is "experimentally illustrated in the *fullest manner possible*," is more than I can explain. I think it means that the Pharmaceutical Council has, in effect, sanctioned the idea, that facts twice stated, however hurriedly, are educationally of more value than when the same facts are taught over a period sufficiently prolonged to allow of the complete assim ation and digestion of them.

In the next subject, "Practical Chemistry," it is more easy to adapt the method to the exigencies of students, in consequence of their pursuing their studies independently of each other; so that I may pass over this with no other remark than to express the hope that the majority of those whose privilege it is to study at Bloomsbury Square, will remain under Professor Attfield's careful tuition for the full ten months, and as many hours of as many days of that period as they can reasonably spare from their other subjects. The retirement of Professor Bentley, who combined the subjects of botany and materia medica, necessitated the appointment of another Professor, and has given us an opportunity of becoming acquainted with the views of the Pharmaceutical Council as to the relative importance to the pharmacist of these two subjects. It is not now my concern to offer any opinion as to the intrinsic value as a science of either botany or materia medica. I am only concerned to consider the teaching of these subjects in their relation to the practical work which the pharmacist has to perform. In this sense I differ entirely from the Council. Botany, however fascinating and valuable as a science, is of importance to the pharmacist chiefly as the handmaid and interpreter of materia medica, and more time and attention should be bestowed on the latter than on the former. What do we find? To botany is given up all the time, and materia medica is relegated to a course of demonstrations, in which the teacher is to set forth "the habitats and methods of cultivation of the plants yielding articles of materia medica, and the mode of preparing drugs for the market will be described, as well as the different qualities of drugs, and the substitutions, accidental admixtures, and possible adulterations to which they are liable."

"The diagnostic characters, and physical and morphological peculiarities of each drug will be indicated, and the histological structure demonstrated, so far as it relates to the tissues in which the active ingredients are present, and to the utilization of such knowledge in determining the purity of powdered drugs," of 17·05 drugs per hour for twenty hours. When, gentlemen, I read that portion of the syllabus, I rubbed my eyes, and if I had been a little older I should have polished my spectacles. That materia medica, which is *par excellence* the subject with which pharmacists should be acquainted, can, in the opinion of our Council, be taught in such a manner is to me an astounding revelation. I presume the Council considers the subject can be taught and learnt in this way, because I remember the righteous indignation which has been expressed by some members of Council against certain heterodox methods, called "cram." The name of Mr. Holmes as an authority on the subject is so well known, that we are bound to consider the exigencies of the case have alone driven him to adopt such a purely artificial system of teaching as to arrange the three hundred and forty-one drugs as roots, barks, leaves, etc., and thus to present to the student at one lecture substances with so few natural affinities as aconite, calumba, senega, ipecacuanha, and so on. It may occasionally, in lecturing, be advisable to show students other roots, barks or leaves which more or less resemble the one which is being described; but to carry this to such a point as to bring together leaves so little likely to be confounded as aconite and buchu, in my opinion scarcely compensates for the many disadvantages which are features of the method. It is with a feeling of relief that I am able to turn from such adverse criticism to express my warm approval of the syllabus of pharmacy and practical pharmacy, which is now amplified and announced to be taught in a manner worthy of the Society's School of Pharmacy.

I think you will gather from what I have said that in my opinion pharmaceutical education at its fountain head is in an unsatisfactory condition, and the Council might well have spent much of the time and some of the money which have gone in other directions to a scheme

for putting the School of Pharmacy on a basis that it shall be equal to fully training men, and be a model for all other schools of pharmacy to copy.

I have already occupied so much of your time in a consideration of the subject of education that my remarks on political action must be brief. By political action I do not primarily refer to legislation by Parliament. As registered chemists and druggists we shall do well not to wait for Acts of Parliament to help us. We have in the Pharmaceutical Society, if adequately supported, the means of accomplishing much that will benefit us if we use all our privileges to render ourselves more worthy of legislative care. It will greatly facilitate the obtaining of any desired Act of Parliament when opportunity arises.

As the Council of the Pharmaceutical Society is the executive through which the wishes and commands of the members must be carried into effect, the persons chosen, and the method of their election, is of the highest importance. Anyone who will consult the results of the poll for members of Council will observe what gives indication of a certain feeling of prejudice against London members. In the earlier years of the Society the Council was mainly composed of London members. Later, when the country members had increased in number, we still found London men headed the lists, but now, without depreciating the merit of those provincial gentlemen who head the poll, we may feel surprised that London members who have done valiant service for the Society are placed so low in the list. There is no doubt but that such a proceeding on the part of the members of the Society may operate by deterring good men in London from coming forward as candidates for the Council. This cannot fail to be harmful to the best interests of the Society, as it is well known that the arduous and almost continuous duties which are demanded from, and cheerfully performed by, the President of the Society, could not be as efficiently rendered by any provincial member. The same, in perhaps a less degree only, will apply to the Treasurer, and to some others upon whom must devolve the carrying out of many details of executive work. At the last election, gentlemen, our Treasurer, who has done such good service for seven years, was at the bottom of the poll of elected members, and another old member of Council, who has devoted a considerable amount of care and time to the work of the Society, was displaced, and has only found a seat on the Council in consequence of the resignation of another valuable London member, one of the ex-Presidents of the Society. It is not for me to dictate to the members and associates for whom they shall vote, but speaking as a country member to my fellow members in the provinces, I would ask them to think not of the present only, but also of the future of pharmacy, and to vote for a larger proportion of men, who by their qualifications and residence in London will be able to do more effective work for the Society.

In conclusion, let me quote the dictum of Professor Leech in his paper on the "Future of Pharmacy," that "If pharmacy is to hold its own, each pharmacist must be in the future the guarantor of the purities of the medicines he dispenses, not the mere distributor." This can only be attained through careful systematic education, and a thorough co-operation with the aims of the Pharmaceutical Society.

Mr. John Harrison moved, and Mr. B. S. Proctor seconded, a vote of thanks to Mr. N. H. Martin for his address, which was carried.

Mr. R. Mann proposed, and Mr. T. M. Clague seconded, the re-election of the officers and Council. On being put to the meeting, Mr. B. S. Proctor expressed a desire to retire from the position he held as Vice-President. Mr. John Harrison and Mr. T. M. Clague appealed to him to re-consider his decision, but Mr. Proctor declined. On the motion of Mr. N. H. Martin, seconded by Mr. Clague, Mr. Alderman Owen was elected to fill the vacancy caused by Mr. Proctor's retirement. Mr. R. Mann's motion, as amended, was then put to the meeting and carried.

A vote of thanks to the Council of the Mining Institute for the use of the room in which the meeting was held, was proposed by Mr. Martin, and seconded by Mr. Proctor, and carried unanimously.

A vote of thanks to Mr. B. S. Proctor for his past services in connection with the Association was proposed by Mr. C. E. Stuart, seconded by Mr. John Harrison, and carried with acclamation.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The Inaugural Meeting of the third session of the School of Pharmacy in connection with the Sheffield Pharmaceutical and Chemical Society was held on Wednesday evening, in the Cutlers' Hall, Sheffield. The chair was taken at seven o'clock by the President of the Society, Mr. J. M. Furness. There was a good attendance of local pharmacists, and among the visitors were the President of the Pharmaceutical Society of Great Britain (Mr. M. Carteighe), the President of the British Pharmaceutical Conference (Mr. F. B. Benger), Dr. Symes, Mr. Radley, and Mr. A. H. Allen. There were also many ladies present.

The proceedings commenced by the President, Mr. Furness, delivering the following

Introductory Address.

I would at once congratulate the members of this Association upon the auspicious opening of the session, and in their name bid a hearty welcome to those visitors who have graced our proceedings by their presence. I venture to say that never since its establishment has the Society commenced a session under more favourable circumstances, and I hope I am right in interpreting this evening's proceedings as an augury of a good, fruitful, and practical session. While at the same time expressing my gratification at the numerous and influential company with which I am surrounded, I would say how deeply sensible I am of the invidious position in which it places me. The many worthy and capable men who have been my predecessors as Presidents of this Society during the quarter of a century of its existence have discharged their duties on similar occasions with conspicuous ability, leaving much for me to follow; but never do I think have they been called upon to perform them under the difficult and dual position in which I feel now. I regard the present gathering rather as the inauguration of the third session of the School of Pharmacy in connection with our Society than the inauguration of the Society's session, which will take place in a pleasanter manner later in the evening, and I frankly confess I would have preferred—had I been a free agent—that my position to-night were filled by someone more specially fitted to deliver an address to students. I hope I shall not be accused of neglecting to take advantage of the present opportunities in not discussing (which would have been more congenial to my taste) the various political, trading, and other questions which are disturbing the pharmaceutical community; but, as I have just said, we are met to do honour to the students, and in the remarks I am expected to offer I wish to address them in a manner to be understood by them upon the calling they have adopted, and which to-night we regard as the commencement of their career.

Many of you will no doubt still have vague and ill-defined impressions of the business you have embarked in. With the enthusiasm so characteristic of youth at the time of adopting a business, you may have depicted with a touch of romance the calling you have chosen, and the career you intend to follow. It will be well that the energetic enthusiasm with which you will be animated to-night should continue; but let me warn you

not to allow it to be succeeded by a reaction that frequently sets in—especially among the youthful practitioners of pharmacy—when this excellent quality sometimes gives way to indifference, then to despair, upon being brought face to face and in contact with the stern realities of life after a too brief experience to be able to form a mature judgment. The impressions you may have formed, or which may have been formed for you by your guardians to cause you to drift into the business you have engaged, may at some time be shaken. Who has not felt this experience? It may take place with you during the early period of apprenticeship, when performing those duties so necessary to make a successful business man, or undergoing the necessary work connected with the shop in keeping it in a bright, nice, and clean condition, or even you may be infected by the desponding literature which you will read from time to time. It would take too long for me to sketch the history you have adopted. Let it suffice if I say that we form, or rather should form, an integral part of a healing art, sometimes called the fourth estate of medicine. We can trace and boast a long historical record. In the early ages we read that our art was practised by the physicians, and in such a manner as to receive a large amount of ridicule and contempt from the practitioners of these days. We are the direct successors of the apothecaries by whom these physicians were replaced. We are also the living representatives of the mysterious and awe-inspiring alchemists of the Middle Ages. Ours is a useful and honourable calling, giving scope for men's highest intellectual attainments, and seeing that the prime objects of its investigations, and results of its researches, are to relieve human suffering and to restore or preserve health to mankind, it may with truth be designated a philanthropic calling.

There is nothing in it to prevent any of its devotees aspiring to and attaining the highest social, public, or scientific position. In addition to the respectability of our calling, it may claim the advantage over others of being freer from monotony and possessing more interest. The diversified character in which it is practised is an especial advantage, and allows to its followers a selection and choice seldom to be found in business. It is also a calling in which a man with proper qualification, combined with diligence, energy, and good character, may, with comparatively small capital, commence business, and without much risk or anxiety earn a modest livelihood, which he can pursue to a ripe old age, even if he is not able to amass a large fortune sometimes open to more commercial undertakings. I shall not concern myself to discuss its relative position in the professional or trading ranks, but I will affirm that in its essential personality, in its multitudinous and varied character, there is ample opportunity yet afforded of exercising those special attainments, scientific knowledge, and higher qualities, which go far to make up the greatest professions in existence. We appear to occupy a somewhat unique position in social economy, and one which is not easily capable of a clear and close definition, and which, in spite of present appearances, will not be readily capable of total extinction. The shop-keeping or trading element is inseparable from our calling as it is now practised, and while it undoubtedly does possess a kind of quasi-professional character, there is more or less of the trading character about it, and of which none need be ashamed. The public recognize the position we hold as one of selectness and requiring more than ordinary intelligence and ability to discharge. They appreciate us above the common trader. I think it was Charles Dickens who wrote—at any rate, if he did not write, I happen to know it was what he practised—that "he recognized the chemist as a man of superior attainments, and that if he was in any strange town, and required information on any question, it was the source to which he generally applied." This custom still continues; for is not our ready accessibility daily made use of by the public to make numerous inquiries for information on every conceivable variety of questions?

To prove that in the past, while pharmacy has always partaken of a select character, it has also been fairly remunerative to the majority of its followers, I will give two quotations which I remember reading shortly after I began to take any interest in pharmaceutical affairs. The first is from an outside source, and is taken from one of those sensational articles in the *Lancet*, which the editor has not yet forgotten how to write, which said, "that chemists' profits are enormous, and that their wives, redundant in sealskins, were to be seen everywhere." The other is from one of our own body, and was contained in a letter signed by "Veritas," which appeared in the *Pharmaceutical Journal* a little time afterwards: "It will give him a good social position, and as time rolls on a better one still. It is a business in which a young man with two or three hundred pounds to commence with may confidently hope to retire on £500 a year by the time he is forty, or on £1000 by the time he is fifty." These opinions produced a profound impression on my youthful imagination, and whatever foundation of truth there may have been in them at the time, I regret to say neither of them have been fully verified by my experience or observation. With these few words on the character of the calling you have adopted, I will as briefly speak upon the prospects that are before you, and the demands and sacrifices required of you in the prosecution of that calling. I should be a false and unjust guide if, while enumerating some of the advantages to be derived, I were not also to mention the present position and prospects. Many of you whom I am addressing will scarcely yet have concerned yourselves with the commercial and political aspects before you, but as upon you, and young men like you, depends the future of pharmacy, a little attention to these matters will not be out of place during your student's career. I am bound to say that at the present time our calling is very much overshadowed by clouds, and that I am unable to welcome you into our ranks under very favourable circumstances. One by one the old landmarks are being swept away, the whole system of trading is becoming revolutionized, and the respect for old traditions and customs is now of none effect. Mutual trading distrust seems to have supplanted the old feeling of personal distrust; I fear that there is less honour and commercial integrity than formerly. We are rapidly losing the more strictly commercial part of our calling, to which we have hitherto had a claim, and what is called enterprise is sapping our more scientific resources into the hands of a select few, so that by many our craft is thought to be in danger.

I do not however share these views. I am prepared to admit that during Her Majesty's reign there has been an enormous increase in the individual merit of our members, and that there has been an improvement of social feeling between them, but as regards the advancement in their material prosperity it is open to doubt. In the past we may have occasionally poached upon the preserves of other trades, but until quite recently our own domains have been free from intrusion. Ours is a business which cannot be carried with only ordinary commercial profits. The public may have had exaggerated notions of the profits taken in our transactions, and have ridiculed us with the well-known aphorism that our profits equalled our receipts, but they felt safe in our hands, and were content to remunerate our skill and competency without serious complaint. Whether they now receive the protection they require from the companies who are filching the trade is open to much doubt, and how long the senseless cutting trade in medicines will be tolerated are difficult questions to answer. A revival in trade, or a few serious mishaps, might produce a healthier tone, and restore the vending and compounding of drugs into its legitimate channels. There is no gainsaying the gravity of ou

present position, but I believe there is still a brighter future for pharmacy. The sure and certain law which operates in favour of those who as a body are educated above their ordinary fellows, will, I believe, evolve a true position for the pharmacist in the social economy, and when the lowest point is reached history will repeat itself, and the turning point will come, slowly, perhaps imperceptibly, yet with certainty, or it may take the form of a revolution, as with the apothecaries of 1815. I believe that the work accomplished by the Pharmaceutical Society since our independence has been established will prevail in the end, and that the individual merit which has been attained will secure some collective privileges to our body rather than special privileges to the few and ordinary privileges to everybody. It is difficult to detect with certainty any sign as to what form this improvement will take. By some it is thought that as we become more competent the medical men will abandon the compounding of medicines to which they have no right in favour of us to whom it properly belongs. If I read times aright I fear we are a long way off arriving at this state of affairs. It seems to me that it remains with ourselves and the public what our position is to be, and that we have little to expect from medical men as a body, who appear less disposed to relinquish the pharmacy portion of their practice than ever. To wrest the dispensing from medical men, and to secure those rights which belong to us, we must not rely upon the honied words which are delivered by eminent physicians on festive occasions ; we must press our claims in a fearless and determined manner ourselves, and let the medical profession understand that it will be inimical to their interests to retain their position as dispensers of medicine, which is capable of no excuse, except that of expediency to themselves. They are not trained for this duty, and are obviously less capable of performing it with credit to themselves or benefit to their patients than are the men who have studied and been especially trained for these duties. When addressing you who are entering our calling I cannot use complimentary language in describing the greatest abuse that you will have to contend with. It is not in defiance, but in self-defence, when I ask if the perpetuation of this system of practising pharmacy by medical men—to which they have no more right than my second year's apprentice, or even my porter —is not likely to produce contempt in place of the respect —almost amounting to reverence—which we all feel for surgery and medicine? So as to understand the difficulties we have to overcome, let us consider for a moment from a medical man's point of view the inducements he has to continue this practice, which is the outcome of the order of things which existed in less enlightened days, and whether we ourselves are in any way accessors to the injustice which is done to us. In the first place, they have not now the work to do they had a few years ago in connection with their dispensing. A wonderful difference in medical treatment now obtains from the days when patients were dosed with linctus, plaister, potion, bolus, clysters, cordials, emulsions, etc., to the extent of eighteen bottles a day. The old methods are being left out of consideration altogether as useless and uncertain in this age of scientific and rational treatment. We are now in danger of losing our old valued weapons to combat disease, and if the progression in this direction takes place at its present rapidity we are in danger of excluding the galenicals from our Pharmacopœia in favour of high-class confectionary therapeutics. There is now a tendency by medical men to give as little medicine as possible to their patients, and that little of a proprietary character. Only quite recently one of the most eminent practitioners stated his belief that drugs were of little or no value. Fortunately for us, the scepticism is very slowly recognized and adopted by the public, and may this not be one reason why they resort to the consumption of such enormous quantities of medicine in other directions. Another reason why medical men decline to give up the rapidly diminishing and easier accomplished putting up of medicines is the inducement and facilities which are offered them for continuing the practice by qualified pharmacists, the very men who if they would see aright must know how deep an injury they are inflicting on the calling to which they belong. So increasing and so keen is the anxiety to supply the doctors with the weapons which are used for the destruction of our craft, that not only are they inundated with frequent importunings, but are offered special facilities. At times they are found dispensers gratis, men are almost sent them to unpack the goods and pack the returns, so as to give as little trouble and as much profit as possible to them. Can we reasonably look for any voluntary surrender from men so well looked after, of the monopoly they possess? The development of high class quackery among medical men is also another source of danger to the rank and file of pharmacy. Nothing is more surprising than the way in which medical men lend their names, and use preparations, the composition of which they are ignorant, for the purpose of advertising the preparations of proprietors who are sufficiently enterprising to seek their assistance, while the medical press seems willing week by week to speak in extravagantly high language of every new nostrum submitted to their notice by Messrs. Cheek, Cure and Co., or the limited manufacturing company of Dupe'em, Make-money and Mystery. When at the Conference in Manchester last month I availed myself of Professor Leech's invitation to visit the Materia Medica Museum at Owens College, and was very much astounded at the large display of specialities which formed a good portion of the specimens. While examining the highly-finished specialities, and noticing the highly attenuated sheets of gelatine cut into squares, and covered or saturated with the most potent drugs exhibited in special cases sent by the manufacturers, I could not help thinking that it tended seriously to postpone the day when the pharmacists would secure the compounding of medicines, and was detrimental to their best interests. If the average pharmacist is to be expected to deal in these preparations, not only will his profits be seriously interfered with, but his skill and efficiency greatly discounted. This system would practically reduce him to a mere distributor, and could just as well be performed by haberdashers, grocers, stationers, or any other class of unskilled traders, at the lowest rate of commercial profit, in the cases where the manufacturer was unable to supply direct. It requires but little reflection to show that if this is to be the system by which medicines are to be distributed in the future, there is from this source only a poor outlook for the 14,000 chemists and druggists on the register, and that if you wish to be successful you must aim for the highest ranks, for, saving the limited few who would eke an existence in putting up patent medicines, and in supplying such fragments as are left to them of the medicines required by the public direct, it would only require the prominent members who were gathered in the adjoining chemical lecture theatre, together with the members of the Pharmaceutical Council, and the examiners of the Society, with a few enterprising firms across the Atlantic, to prepare and supply all remedies required by the physician in the treatment of disease. If this is the direction in which high class and scientific pharmacy is to be developed, it is difficult to see where our collective privileges are to be derived in response to the increased individual merit demanded from us, and how we as a body are to progress, when a few of the most prominent men on board our craft are prepared to satisfy the demands the medicine-consuming public require through the medical men. The majority are by the very necessity of existence driven as a last resort to develope that class of trade which our forefathers in their ignorance pursued.

I fear I have been tempted to trespass on delicate

ground, and dwell too long on this subject, which, however, I consider is of most vital importance. I would now for the few minutes I have to detain you speak a few words upon what is demanded of you to become a practitioner of the calling you have adopted. You will know that our craft is represented by the Pharmaceutical Society, which, as you will also know, was incorporated by Royal Charter in 1843, and in 1868 succeeded in obtaining the Pharmacy Act, which lays down the qualification to be required of those who are to be admitted to our ranks. The working of this Act is vested in the Council of this Society, which consists of twenty-one members, who are elected from a restricted few by those in business who choose to become members of the Society by payment of an annual subscription. I would here, in parentheses, advise you and all connected with the calling to join this Society as soon as an opportunity is presented. Without entering into the advantages and pleasures to be derived from such a connection, a very brief reflection as to the position it holds to the body corporate, and the functions it discharges, should convince everyone of taking a part—not merely a passive, but an active part—in its affairs, bearing in mind that it practically has the destinies of our calling in its hands, and for weal or for woe is working for the whole trade. Some of you whom I am addressing will doubtless in a short time be scattered in various parts of the country. I would also extend the recommendation to join the Pharmaceutical Society to allying yourselves to provincial Associations such as this. Speaking personally from my connection during seven years with this Association, during which time I have not missed above three of its evening meetings, I say that too much importance cannot be attached to the individual, local, and general benefits they are capable of producing. The Act of Parliament referred to enacts that before any person shall practice as a chemist and druggist he must pass two examinations, and it also legalises a third or optional examination for the title of pharmaceutical chemist. The first, or Preliminary examination, is a purely scholastic one, to test the mental capacities of those entering the trade. I shall presume that you have all passed this ordeal or its equivalent. If you have joined the calling without doing so it is much to be regretted, and I can promise you a large consumption of valuable time in working off arrears. It would also be well for you to aspire to the highest test enacted, by attaining the Major qualification. The satisfaction gained in doing so is not to be measured by the mere addition of pharmaceutical chemist to your name; but the knowledge you will acquire and the position you will have earned in the scientific world cannot fail to be especially remunerative and advantageous in your commercial and social career. It is, however, more with the Minor, the second, technical, or qualifying examination, with which you are at present concerned, and which, soon after you become twenty-one years of age, you will be anxious to pass. This test demands of you a knowledge of chemistry, botany, materia medica, pharmacy, dispensing and prescription reading. These sciences and studies are all necessary for the prosecution of your business. A portion of them will, of course, be learned by you in the discharge of your ordinary duties in the shop, but of the remainder it will be necessary to have the advice and assistance of competent teachers to lay the foundation of that scientific knowledge which you must acquire before being certified as competent to practice pharmacy on your own account. To-night we are met to inaugurate the third session of the School in which you are to prosecute your studies, and I would remind you of the opportunities you possess. Only a few years ago the advantages you are now availing yourselves were unattainable elsewhere than in London. The recent establishment of this School by the Council of the local Pharmaceutical Association, at the solicitation of earnest students, like yourselves, is the outcome of long and careful thought, and is maintained with considerable anxiety. The establishment of this School is a decided advance with the times, and is a matter of much congratulation for the town no less than yourselves. To you it is a great gain to be able to procure near to your homes or places of occupation an efficient pharmaceutical education, which will not only qualify you to pass the test which the Legislature demands, but will lay for you the foundation of that knowledge which in these days of advanced education and severe competition can alone make you number among the successful practitioners of pharmacy in the future. I trust that the efforts which are now being made will continue to be appreciated; that they may be maintained, and prove but the beginning of a reputation which shall place Sheffield in the foremost ranks as a centre of provincial pharmaceutical education. It is gratifying to know that our efforts to advance and improve are not only appreciated and assisted by the Council in London, but by the presence amongst us to-night of the President of the Society they are encouraged in such a manner that cannot fail to have a stimulating effect upon us as well as similar societies throughout the country. It only remains for me now to urge upon you diligence in your studies, and punctuality and regularity in your attendance at the classes. Do not readily allow anything to cause your absence from a single lecture, for by so doing you not only lose the continuity of the subject, but the loss may be greater to you than you imagine, in making you indifferent, to which the next step is idleness. I would also urge you to conscientious attention to your home studies. As a rule it is not well to make too copious notes during a lecture—it frequently distracts the attention, which should be better employed. It is better to take short notes or headings of what is said and to amplify them with the assistance of suitable text-books or fellow student. The time employed in this way will be amply repaid in making the information lasting, and in clearing the points which the rapidity of the lecture has not made distinct. The best efforts of your teachers will be of little avail if you rely upon them solely. The success you obtain depends as much, nay more, on yourselves than on them. To a certain extent it is impossible for them to teach; they can only direct you how to learn. You will have the advantage of their knowledge and reading in preparing lectures for you, and they will superintend your personal efforts, but after all this will merely amount to an indication of the best methods you should adopt, and it remains with you if their labours are to be successful. If you avoid what is called cram, and adopt a spirit of earnestness in all your studies, you will have no fear to dread the examination room. You will have studied for the sake and pleasure of knowledge, and your answers will reveal a practical acquaintance with your subject which will carry weight accordingly. You will earn respect and gain information which will be invaluable in your future career in business. You will thus see that you are called upon in your early career to make some sacrifices over your companions who may have adopted a less select calling, which sacrifice may have to be continued through life. Your reward will be the satisfaction of having a cultured and well-ordered mind, which will be of inestimable value in your progress through life, and a comfort and solace to you in the days to come, when time hangs heavily on the hands.

My task is now done. I know how imperfectly it has been performed. I would in conclusion wish you success and good speed in the career that is before you. It depends upon yourselves what that career shall be. No other but you can mould it. If you employ your time well and aim high success will assuredly follow. Seize then your opportunities; make the most of them; do not let them slip by. As I have already said, you have a business capable of employing your highest intellectual powers. Let there be no desponding, no repining; seek to leave things better than you find them. Always be

up and doing. Achieving, pursuing, labouring, and waiting the good fate which assuredly will follow such a combined action. Endeavour to discharge the duty every man owes to his calling, bearing in mind the apt quotation of Lord Bacon, which I think has been before applied to pharmacy, and with which I will conclude this hurriedly-prepared address :—

"I hold every man to be a debtor to his profession, from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavour themselves by way of amends to be a help and ornament thereto."

At the conclusion of the address a vote of thanks was unanimously accorded to the President.

The prizes and certificates awarded to the successful students of last session were then presented by the President of the Pharmaceutical Society, who availed himself of the opportunity to point out some of the advantages that might result from local efforts to promote pharmaceutical education.

The Annual Dinner.

The annual dinner was held at the Cutlers' Hall later in the evening, Mr. J. M. Furness, the President of the Sheffield Society, occupying the chair, and being supported by most of the local chemists and druggists. The President, after dinner, proposed the customary loyal toasts, and these having been duly honoured, Mr. Cubley proposed the toast of "The Pharmaceutical Society of Great Britain." He said they all owed it allegiance, from the President down to the youngest amongst them. The Society exercised a great influence over all matters connected with their trade, and one which for good or for evil would affect their business relationships with the rest of the nation. It had done good work in the past to raise the status of education amongst them, and it had done a great deal towards banding members of the trade together in a legal form. Some of them were not content with the amount of protection that that legality gave them. On the other hand some were not content with the amount of education fostered by the Society, and wanted it to go still further. Perhaps if they could strike the happy medium between the two they would get at a better basis than some people thought they were at present standing upon ; but in every other respect they owed the Society a great debt of gratitude for the care it had taken of them. He did not think a better illustration of that could be given than the question that arose in Edinburgh lately, about which they had all been clamouring. They thought that greater protection should be given under the present Acts by which they were governed; but when these came to be placed under the test of the law it appeared that the Society could not protect them in the particular manner in which so many of them wished to be protected. Referring to the many different classes of members he hoped the Society in future would conceive it to be its duty to band them more thoroughly and weld them together as a whole. If all men were admitted to an equal status it would help the benevolent fund, and induce many more to subscribe to that noble and beneficent charity.

Mr. Preston asked the President to give them some information with reference to the Bill before Parliament some few months ago.

Mr. Carteighe, who was very cordially received on rising to respond, congratulated the Association under whose auspices that gathering was being held, and then proceeded to say he very much sympathised with the observations of Mr. Cubley as to the inconvenience of having a number of titles and grades in the Society. It was extremely difficult for a body with the powers which had been conferred upon the Society by statute to carry out that thorough protection of the trade which Mr. Cubley thought should be carried out. The Society had done all it could with its present powers to deal with the evils Mr. Cubley had referred to. Though that was a body representative of the trade it had not the power of dealing with the interests of the trade in the comprehensive manner that many people supposed. Its protective action was limited to poisons. He was very sorry the powers for the protection of the public were not sufficient, but supposing they were as complete as wished, with regard to the sale of poisons, the Society would still be unable to give that so-called protection to the trade at large in regard to the great mass of articles that the trade dealt in, and which so many of their craft thought should be protected. Mr. Carteighe explained at some length how the Act under which the Society received its powers had been opposed, and the powers sought for had been limited. The Bill of 1868 was not the Bill of the Pharmaceutical Society, but a Bill passed to the orders of a Select Committee, and the result of a Parliamentary compromise. The Society did the best that could be done with an imperfect instrument, and if its efforts did not effect all that was desirable, they should not blame the Society, for it had been driven, by the opposition offered by the trade, to relinquish the attempts made to improve the position of pharmaceutical chemists, and to accept a compromise which failed to secure that end. Then the numerous titles created an amount of confusion in the public mind; and a new word was wanted to replace the unfortunate word "chemist," which applied to so many branches of practice. The views of the present governing body were practically those of Mr. Cubley; and the only question was, When could they be carried into effect? He should like to see every person who came up for the Minor examination pay an examination fee, that should also be a registration fee, making him a life member of the Society. But there was such a tremendous cry if the examination fees were raised in the slightest degree. There was an idea that raising the fees was an injustice to existing members; but the fees were low, and they must have funds somewhere. They ought all to belong to the Society to make it powerful for good, powerful for propulsion, and for making influential persons respect the body ; and they could not get that without money. They should not wince under the conditions imposed on those who entered the trade, for the only chance for the chemist and druggist of the future to hold his own was that he should have such a standing and such a knowledge of the elementary science on which his business was based, that would gain for him as an individual the respect of every individual customer. If they did that they could snap their fingers at co-operative societies and everything else. They had in Sheffield all the materials for building up a good local school. As to the Bill of last year, it was a victim of the block system which prevailed in the House; but the great majority of members were in favour of the measure, and presumably next session it would be submitted again to Parliament, and they would see the result. The Council was very unwilling to give up trying to obtain such a measure, but if the majority of the trade were apathetic, or refused to join the Society, the Executive could not hope to obtain a satisfactory measure. There would always be a source of weakness until the great majority of the members of the trade enrolled themselves in the ranks of the Society.

Dr. Symes proposed, "The Sheffield Pharmaceutical and Chemical Society," coupled with the name of Mr. Bradwall, the vice-president. He was glad to find they had a school in Sheffield in such a flourishing condition. He had had some experience in founding such schools, and they had founded theirs in Sheffield on the right principle and on a solid foundation. Those who began to study early grew up with the facts almost as part of their nature, and presented themselves at examination not "veneered," but as "solid" men. But there was something beyond education and examination. They had to live by their trade ; and he was glad to see that the Sheffield Society embraced some 75 per cent. of the whole

trade of the town. He warned them against attempting selfish legislation, for, in his opinion, as soon as they began to legislate in that way the powers they already possessed would be taken from them.

Mr. Bradwall responded, and gave a sketch of the past work of the Association.

Mr. Ward, in giving the toast of "Kindred Provincial Associations and the British Pharmaceutical Conference," expressed the opinion that when they read in the Journal from time to time that the Pharmaceutical Society had invested so much in consols or ground rents, etc., they thought they ought to have some further help in their efforts at Sheffield from that Society.

Mr. Benger, whose name was coupled with the toast, responded. The British Pharmaceutical Conference had for the past quarter of a century occupied the second place amongst the pharmaceutical organizations of this country; and he was proud to have been connected with it in various capacities since the date of its inauguration. The Pharmaceutical Conference had done something towards the advancement of pharmacy. Its members had contributed no less than 500 papers at the annual meetings, and those with the discussions which followed them had been published, first in the *Pharmaceutical*, and other Journals of the trade, and then collectively in the 'Year-Book of Pharmacy,' which had been edited for thirteen years by one of the most accomplished pharmacists of our time, Mr. Louis Siebold. It was gratifying to know the Conferences were increasing in popularity, and that the last one, which was held in Manchester was considerably the largest that had yet been held. A successful provincial school of pharmacy was a phenomenon worthy of careful study, and he congratulated them on the success of their Sheffield institution.

Mr. Carteighe proposed "The Sheffield School of Pharmacy," remarking that the work it was doing was very gratifying. They must be successful themselves, and then the parent Society would come forward and supplement their success.

Mr. G. A. Grierson, in replying, said he was very glad to hear Dr. Symes commend their school; and he now had greater hopes of success.

Mr. A. R. Fox proposed "The Visitors," coupled with the names of Messrs. Radley and Allen. It would ill become him to offer any words of eulogy, but he could not resist pointing to the valuable services those gentlemen had performed in the advancement of pharmacy, both locally and generally. He referred to the fact that the dental profession was largely represented; and he was sure they were all glad to see so many visitors there that evening.

Mr. Radley, in responding, said he did not feel a stranger there, nor uninterested in the proceedings of that night, for in the past he had been closely associated with other similar associations. He trusted the Association would still further prosper, and that general good would result. He was sorry to hear there were apparent clouds over the trade, but he thought a change for the better would and ought to come.

Mr. Allen also responded.

The Chairman said he felt it as a personal compliment that they had such a large gathering, and he was sure it was only the forerunner of many more even more successful gatherings in the future.

The proceedings then terminated.

BOOKS RECEIVED.

MANUAL FOR THE PHYSIOLOGICAL LABORATORY. By VINCENT DORMER HARRIS, M.D. Lond., etc., and D'ARCY POWER, M.A., F.R.C.S., etc. Fourth Edition. London: Baillière, Tindall and Cox. 1888. From the Publishers.

TABLES OF VETERINARY POSOLOGY AND THERAPEUTICS. By GEORGE A. BANHAM, F.R.C.V.S., etc. London: Baillière, Tindall and Cox. From the Publishers.

Parliamentary and Law Proceedings.

ILLEGAL USE OF METHYLATED SPIRIT.

At the County Petty Sessions at Tynemouth, on Monday, Mary Smaldridge Johnston, who has shops at Byker, Wallsend, and Willington Quay, was summoned, at the instance of the Inland Revenue, for that she did, contrary to section 130 of the Spirits Act, 1880, sell a certain article in the preparation of which methylated spirit or any derivative thereof had been used.

Mr. E. Clarke, Newcastle, said he had been instructed by the authorities to prosecute in this case. The facts were that Mr. John Flint, supervisor, purchased half a pound of "pennyroyal," for which he paid 2*s.* 6*d.*, at the defendant's shop at Willington Quay. It was found on analysis to be manufactured with methylated spirit instead of pure spirit of wine.

Mr. C. W. Newlands, who defended, admitted the sale.

Mr. Charles Procter, Fellow of the Chemical Institute, and Analyst to the Government, proved the receipt of a sample of "pennyroyal" from Mr. Flint. On analysis he found it corresponded with "pennyroyal," but on removing the oil he found it had been prepared with methylated spirit instead of pure spirit of wine.

In answer to Mr. Newlands, witness said he would not swear there was no spirit of wine in the preparation. The price of half a pound of "pennyroyal," manufactured with pure spirit of wine, was 7*s.* 6*d.* Mr. Newlands having addressed the magistrates in mitigation of penalty, a fine of £5 and costs was imposed.—*Newcastle Evening Chronicle.*

On Wednesday, at the Birmingham Police Court, Charles Gibbing Crooke and Solomon Taylor, New Meeting Street, were summoned "for selling a certain article capable of being used internally as a medicine—to wit, compound tincture of rhubarb—in the preparation of which methylated spirit had been used, contrary to the form of the statute," whereby they incurred a penalty of £100. Mr. H. Costello, Supervisor of Inland Revenue, prosecuted, and Mr. Glaisyer, (Glaisyer and Porter), defended.

John George Fife, inland revenue officer, stated that he purchased a four-ounce bottle of compound tincture of rhubarb at the defendants' shop on May 12 last. He paid 8*d.* for the compound, which he labelled, and sent to Somerset House.

George Naylor Stokes, Analyst to the Board of Inland Revenue, stated that he analysed the contents of the bottle produced. The bottle contained between 10 and and 20 per cent. of methylated spirit. In reply to the Bench, witness said that the test he applied was Riche and Bardy's. The difference in using methylated spirit instead of rectified spirit would be about 15*s.* a gallon in favour of the defendants, the former being duty free.

Mr. Glaisyer said his clients were totally at a loss to account for the presence of methyl in the preparation, because they were not informed that the bottle contained the spirit until two or three months after it was bought, and therefore were unable to trace it. However, the Bench had to deal with the case in the interest of the Inland Revenue, and not the public.

The Excise penalty was £100, but Mr. Costello said that the magistrates had power to reduce the penalty to any extent they liked.

Mr. Lowe said the defendants were most respectable tradespeople, and he was certain they would do nothing intentionally against the regulations of the Excise.

The Bench, however, recognized the object of the Revenue in bringing the case forward, and they thought a fine of £5 and costs would suffice.—*Birmingham Daily Post.*

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Dott, Bell, Alcock, Kirkby, Pinkerton, Symons, Benger, Sapwell, Local Secretary, W.

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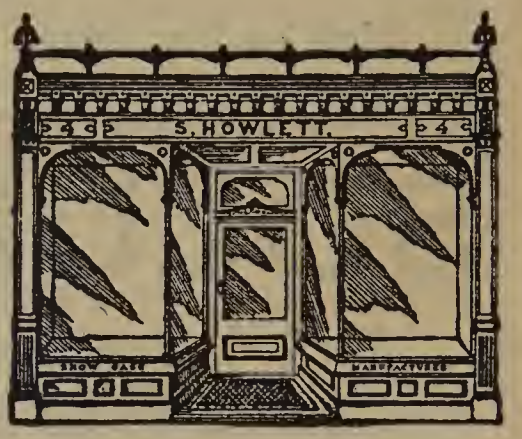

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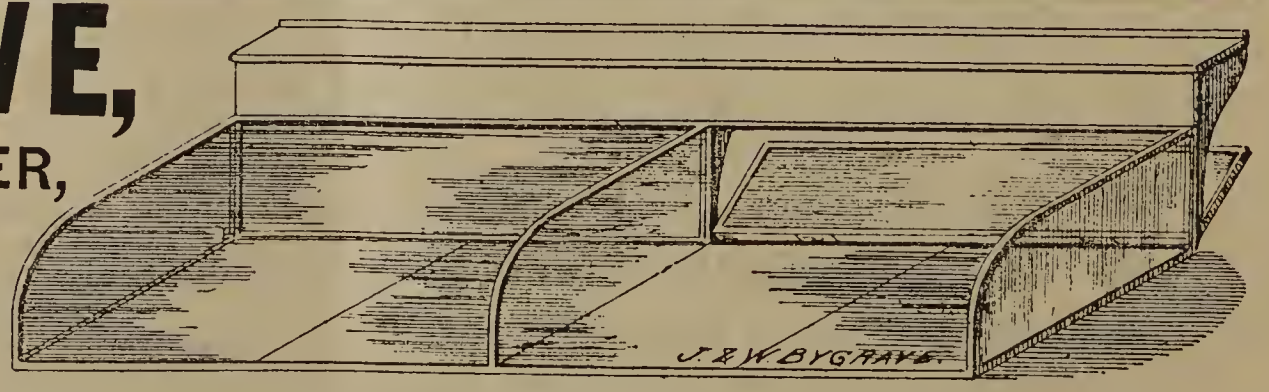

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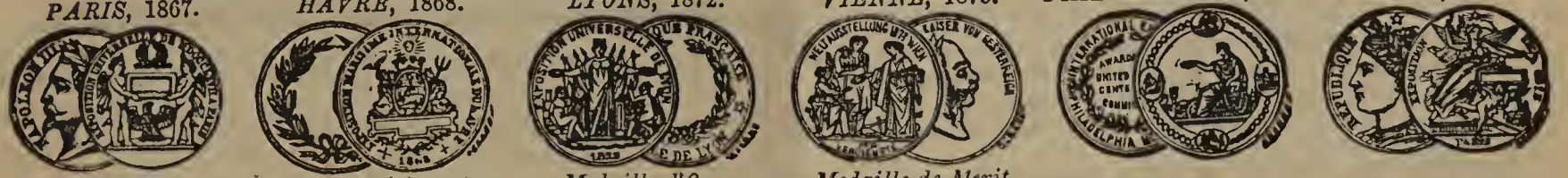

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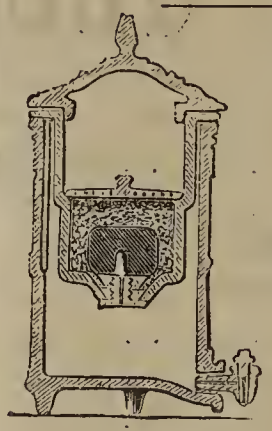

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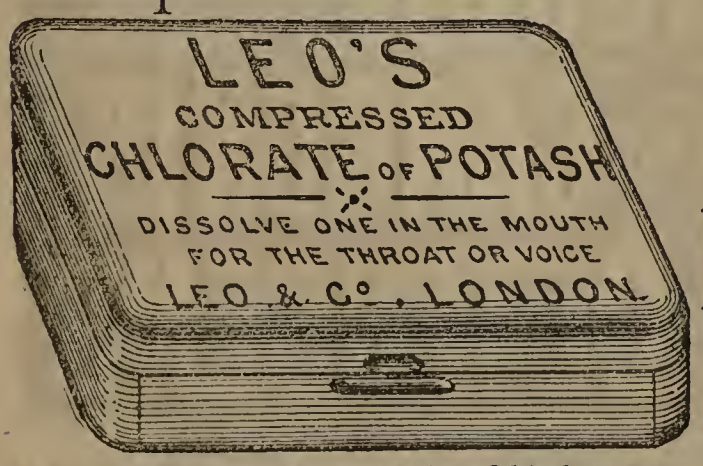

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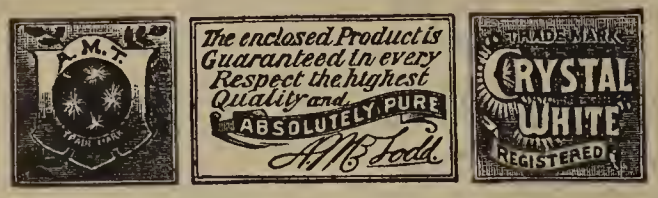

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£250.—A Dispensing and Prescribing Business, with Dentistry, at a sea-side place in Devon. Returns £400. More than half profit. No, patents sold. Mahogany and mirrored Shop in Main Street. Private entrance. Large yard. Good house. B., Messrs. Berdoe, 30, Jewry St., Aldgate, City, London.

BUSINESSES FOR DISPOSAL.

LIVERPOOL.—Consequent on the continued ill-health of the proprietor, that old-established Business called the "Exchange Pharmacy." To an energetic man this is an opportunity rarely met with. Terms moderate, and cash. Apply, Mr. Heaton, 14, Exchange Street East, Liverpool.

SEASIDE. Increasing Retail and Dispensing Chemist's Business. Good locality. Fullest investigation. Returns £500 under manager. Rent moderate. Chemicus, care of Wright, Layman & Umney, 50, Southwark St., S.E.

BEST situation in county town of Kent. Returns about £600. Apply, Kent, Barron, Squire & Co., Bush Lane, Cannon St., London.

OLD-established genuine Retail, returning (under Assistant) £600; capable of large increase under principal. Good house. Nice position, large shop. Price about one year's returns; part could remain, if desired. Trial allowed. Medicus, Messsrs. Hill & Son, 101, Southwark St.

£50 CASH and balance by instalments will purchase a handsomely fitted Pharmacy. Main road. Rent £50. Returning (under Manager) £4 per week; lately under principal was returning £10. Address, Chemist, 184, Dalston Rise, Dalston, E.

CATHEDRAL town, Midlands.—A thoroughly good old-fashioned light Retail and Dispensing, with a little agricultural. Not much booking. Shop is in excellent position. Well fitted and stocked. House good. Rent low, on lease. Returns £1150. Price £950. Cathedral, care of Mr. Brett, Valuer, 60, St. Stephen's Rd., Leicester.

GOOD Family and Dispensing Mixed country Business. Established 50 years, Owing to death of proprietor to be disposed of immediately. Address, Chemist, care of Mr. Hilditch, 54, High St., Congleton.

£650.—South-west of England. Good market town, with a very large neighbourhood. Only one other chemist. A light Retail and Dispensing Business. Returns £900. Profits good. Price £650, to effect quick sale, owner taken another business. The shop is handsomely fitted and well stocked. Address H. G., care of Messrs. May, Roberts & Co., 9, Clerkenwell Rd., E.C.

£250.—LONDON, W. A light Retail and Dispensing Business in a busy and good locality, now returning at the rate of £600 yearly. £250 cash will be accepted, and it is under most exceptional circumstances offered at this price. The shop is well fitted and stocked, with a good residence address. B. H., care of Messrs. Meggeson & Co., Miles Lane, Upper Thames St., E.C.

WEST Midland County.—In one of the best market towns, an old-established Family, Retail, and Dispensing Business. Returns £1,100. Price £950 to an immediate purchaser, as the proprietor is about to take a large business at sea-side. Address West Midlands, Office of the *Chemist and Druggist*, 42, Cannon St., E.C.

DORSET.—Very good light country Retail, Prescribing, and fair Dispensing, with some agricultural. In very desirable part. Returns £935. Net profit £300. Good house. Price £650. Dorset, care of Mr. Brett, Valuer, 60, St. Stephen's Rd., Leicester.

SOUTH of England.—Old-established Retail, Dispensing and Prescribing Business. Nothing heavy. Same hands many years. Large modern Shop, handsomely fitted and well stocked. Returns average £950. Net profit £300. Stock and fittings worth £600. Having taken large business, will accept £650. Apply, Antipyrin, 59, Petherton Rd., Highbury, London.

BUSINESSES FOR DISPOSAL.

YALDING, Kent.—Messrs. Berdoe & Co. are instructed to sell by tender the Chemist's Business at Yalding, unopposed for 5 miles. Rent only £14. 6-roomed house, greenhouse, shop fairly fitted and stocked. Present returns £4 weekly, but would do £8 to £10 if better stock kept. Excellent opportunity to anyone with £80 to £100 wanting country business, capable of increase. Tenders received up to Friday, 28th October. Full details of Messrs. Berdoe, 30, Jewry St., Aldgate, City.

BIRMINGHAM.—An old-established Dispensing, Prescribing and light Retail. Returning £12 weekly. Capable of great increase. Splendid 10-roomed house. Grand corner shop. Rent £45. Owner, having another shop four miles away, will sell for £100, cash down, to an immediate purchaser. Address, Chemist, 210, Camp Hill, Birmingham. No agents.

BUSINESSES WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

CHEMIST about to retire.—A good class Retail and Dispensing Business wanted, to which advertiser could have about 6 months' introduction as Assistant. Must bear the strictest investigation. No agents treated with. Address, with full particulars, in confidence, W. Lewis, 96, Marchmont St., Russell Sq., W.C.

A GOOD class Retail and Dispensing Business, returning about £800 or £900. Must bear strictest investigation. Principals only treated with. Address, with full particulars, in confidence, to Mr. Godfrey, 2, Gervis Ter., Boscombe, Bournemouth.

A PROFITABLE improving Business, with good house and garden, at moderate rental, in a healthy district near London, or a neglected business, where there is good scope for increase. Particulars, which will be treated confidentially, to Pharmacist, care of Messrs. Maw, Son & Thompson, Aldersgate St., E.C.

IN or near London, a genuine Business that will bear strict investigation. Returning about £800. Send full particulars, in confidence, to X. Y. Z., care of Mr. Bremridge, 17, Bloomsbury Square.

A DISPENSING and Retail Business in good locality. Must bear the strictest investigation. No agents. Address, with full particulars, in confidence to R. D., Messrs. Toogood, Burlington Buildings, Heddon St., Regent St., W.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

Dorset.—Good market town. Returns £950, and increasing. Nett profits £300. Price only £650. Handsomely fitted. Little opposition. Recommended.

Midlands.—Cathedral city. Light Retail and Dispensing. Returns £1100. Profits good. Price £950.

East Coast.—Retail and Dispensing. Returns £600. Price £500. Agency pays rental.

Home County.—Market town. Retail and Dispensing. Returns £950, at full prices. Price £800.

London, S.W.—Good ready-money Business. Very profitable. Returns £850. Price £800.

London, W.—Retail and Dispensing, in good thoroughfare. Returns £500. Price £250. A rare opportunity.

F. J. BRETT,
VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

Valuations.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

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Midlands.—High class Retail and Dispensing. Returns £400. Price £400.

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Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

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Established 1870.

West of England.—Retail and Dispensing. Returns £1120. Net profit £400. Price £950.

Oxfordshire.—Retail, Dispensing and Prescribing. Returns £1450. Good house and garden. Price £1250.

Midlands.—Retail and Prescribing. Returns £1000. Same hands 10 years. Price £500.

South Coast.—Retail and Dispensing. Returns £700. Net profit £300. Price £650.

London.—Main road. Same hands 20 years. Guaranteed net profit £300. Price £600.

N.W.—Heath vacancy. Corner Retail. Returns £250. Well fitted. Only £130.

N.—Same hands 12 years. Returns £200. Neglected. Price £85.

Others from £100 to £4000 free on application.

MARK SMITH, Chemist,
Valuer and Transfer Agent,
LOUTH, LINCOLNSHIRE.

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(VIN AURANT, P. B.)

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Sample, six stamps. Special quotations to large buyers.

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MESSRS. ORRIDGE & CO., Chemists' Transfer Agents, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. Orridge & Co. has been known as a Transfer Agency in the advertising columns of the Pharmaceutical Journal since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer :—

1. £660.—London, N. Main road. Bus and trams pass the door. Dispensing, Prescribing and Retail. Returns last year £660. Increasing. Shop well fitted in mahogany and good stock. Price about £635.
2. £650.—London, S.W. Good class Retail and Dispensing, with some Dentistry attached. Returns last year nearly £650. Good house, with every convenience. Price about £500.
3. £650.—London, W. General Retail and Dispensing, with Post Office attached. Good position. Returns £650. Postal profits extra. Well fitted shop. Good 10-roomed house. Price £650.
4. £900.—Home County. Good class Retail and Dispensing, in a large town within easy access of London. Returns over £900 yearly. Profits very good. Well stocked, handsome shop and good house. Price about £850. Part can remain if wished. Good introduction will be given.
5. £1100.—Herefordshire. Light Retail, Dispensing, with some Agricultural. Returns over £1100 yearly, with good profits. Large, handsome double shop and good stock. Good house, &c. Vendor being anxious for an early sale will accept £950. Worth attention.
6. £350.—Western County. Retail, Dispensing and Prescribing. Returns under manager nearly £325, with good appointment attached. Handsomely fitted and fairly stocked. Good house and garden. Valuation only required. No premium.
7. £1450.—Oxfordshire. Good class Retail, Dispensing and Prescribing. Returns nearly £1450. Net profits upwards of £500. Large house and good garden, greenhouse, stable, &c. Price about £1300. References must be enclosed.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.
32, Ludgate Hill, E.C.

1887. TWENTY-FIRST SEASON.

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LUNG PROTECTOR

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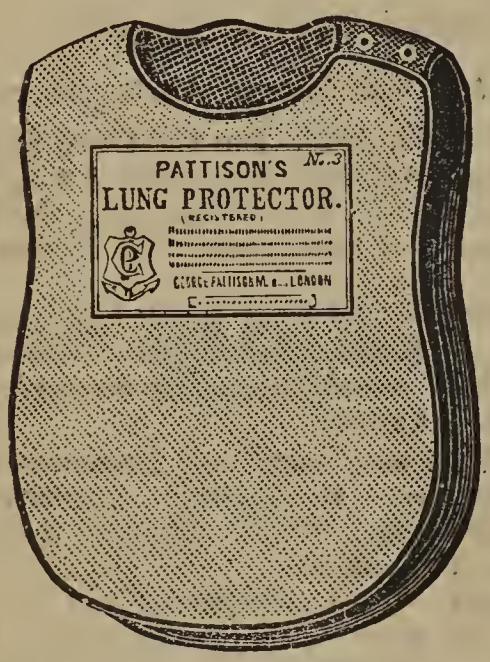

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Lung Protector.
THE AMERICAN

Lung Protector.
THE CANADIAN.

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FELT CHEST PROTECTORS, C. QUALITY. { Single .. No. 1, 7/-; 2, 9/-; 3, 11/-; 4, 14/-; 5, 18/- per dozen.
Double .. No. 1, 16/-; 2, 22/-; 3, 28/-; 4, 34/-; 5, 44/- „

These are warranted equal to BEST of other makers, but are NOT recommended.

Terms: All Wholesale Houses either allow a large Discount for Cash, or quote the goods at Reduced Net Cash prices.

GEORGE PATTISON,

Inventor and Manufacturer,

139, ST. JOHN STREET ROAD, LONDON, E.C.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 904.] SATURDAY, OCTOBER 22, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 9th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, Nov. 2nd, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 2nd day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 5th, 1887.

For list of approved Candidates see next page.

There are at present *forty-six* annuitants, receiving £1575 per annum, and casual relief is also granted amounting in 1886 to upwards of £630, involving a total annual expenditure of more than £2200.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of
Half-a-crown are entitled at each election of Annuitants to .. .. ONE Vote.
Five Shillings .. .. TWO Votes.
Half-a-guinea .. .. FIVE Votes.
One Guinea .. .. TEN Votes.

And to increase in the same proportion.

Five Guineas are entitled to .. .. FIVE Votes for life.
Ten Guineas .. .. TEN Votes for life.

And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

BENEVOLENT FUND.

APPROVED CANDIDATES.

BAKER, SARAH E. Age 52. Finsbury Park, N. Widow of Frederick Bond Baker, of Dalston, a registered Chemist and Druggist in business before August 1st, 1868. Applicant has hitherto been earning a livelihood by dressmaking, but too close application to work has seriously affected her sight, and she is very deaf. Her only son, a detective officer, is married, has a family to support, and cannot render much assistance.

COLLINS, MARIA. Age 72. Sydenham. Widow of John Richard Collins, of Clapham, an Annuitant from 1885 to 1887, who was for forty-four years previously a Member of the Society. She has two sons (one a permanent invalid) and two daughters, neither of whom can render her much assistance. Applicant is in feeble health, and endeavours to earn a little by letting furnished apartments.

GOADSBY, ELIZABETH. Age 68. Salford. Widow of Francis Goadsby, of Manchester, a registered Chemist and Druggist in business before August 1st, 1868, who died in April, 1882. Applicant is quite unable from excessive weakness to do anything to earn her own living. *Fourth application.*

JONES, AUGUSTA. Age 59. Marlborough. Widow of Charles Jones, a registered Chemist and Druggist in business before August 1st, 1868. Husband was in business twenty-four years at Cowes and Marlborough, and died in 1878. Applicant continued to carry on the business until 1884, but was unsuccessful. The interest on £100 invested in gas shares is all she now has to depend upon, as she has no relatives able to help her, and her health is very feeble.

MCINTYRE, JESSIE. Age 72. Tweedmouth. Widow of Peter Slater McIntyre, of Tweedmouth, a Life Member from 1869 and a subscriber to the Benevolent Fund for sixteen years. Applicant's husband died in June, 1886, and the business was sold for the benefit of the creditors. She is quite without means, and her age and infirmities render her almost helpless.

POWNALL, LYDIA SARAH. Age 67. Lower Clapton. Widow of John Pownall, of Manchester, a Member of the Society from 1842 until his death in 1857. Applicant carried on her husband's business until 1872, when it was sold. She is in delicate health, and is at present living with a sister, who is also an invalid. Applicant makes a little marking ink, from the sale of which she realizes about £5 a year. *Third application.*

SOWTER, EMILY SARAH. Age 53. Tottenham. Widow of George Sowter, a registered Chemist and Druggist in business before August 1st, 1868. Husband was in business in London for about ten years, and at his death in 1881 applicant was left with six children. After his death a bill of sale for £35 was put in force, and her home sold up. She has to support four children. Applicant's eldest son, who lives with her, renders a little assistance, and she does a little needlework, but continued ill-health prevents her earning much in this way towards her maintenance. *Third application.*

SPENDELOW, MARY E. Age 57. Widow of Richard William Spendelow, of Liverpool, a registered Chemist and Druggist in business before August 1st, 1868. Husband was unsuccessful at the last two Elections of Annuitants, and died in January last, leaving his widow entirely without means.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-SIXTH SESSION, 1887—88.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.
Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

Professor WYNDHAM DUNSTAN.....CHEMISTRY.
Professor ATTFIELD ....PRACTICAL CHEMISTRY.
Professor GREEN .....BOTANY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.
Mr. HOLMES .....MATERIA MEDICA.

THE PHARMACEUTICAL JOURNAL

Guaranteed Circulation of 7000 Copies Weekly.

(The LARGEST Issue of any Journal addressing Chemists and Druggists.)

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SPECIAL TERMS FOR THE FOLLOWING ADVERTISEMENTS.

ASSISTANTS WANTED, BUSINESSES FOR DISPOSAL, BUSINESSES WANTED — Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional line not exceeding seven words, or less, 6d.

ASSISTANTS SEEKING ENGAGEMENTS *only* — Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.

*** *In these Advertisements, Two Initials or Two Figures count as one word.*

Advertisers are requested to observe:—

1.—That Advertisements are received by the Publishers not later than Ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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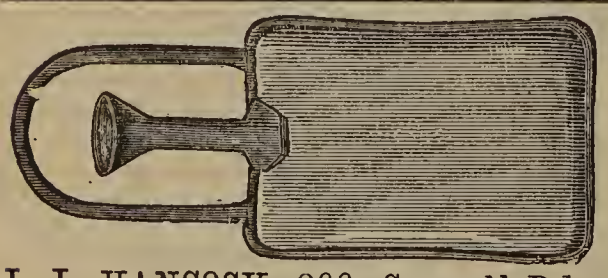

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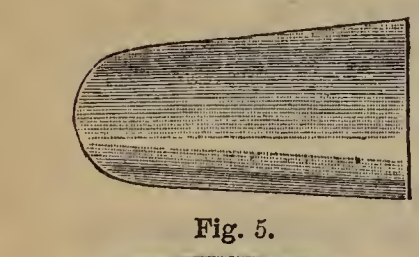

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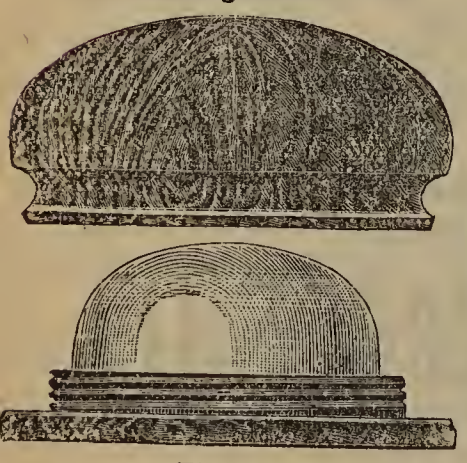

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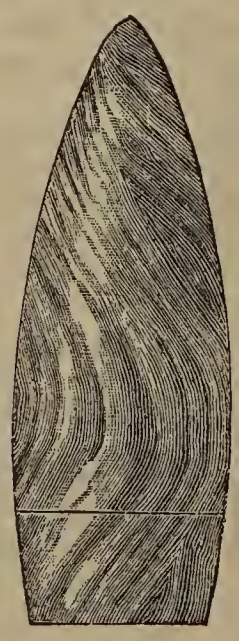

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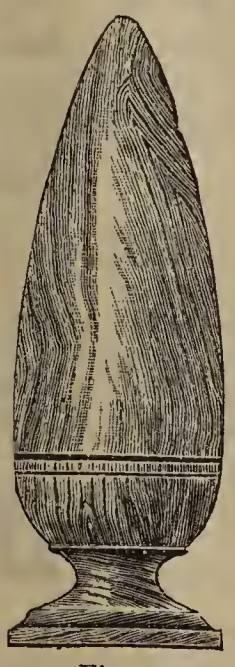

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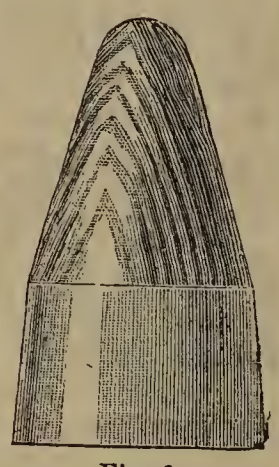

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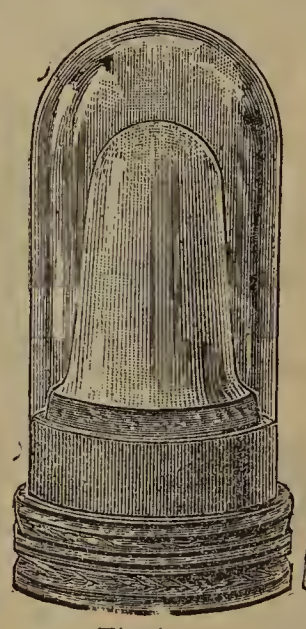

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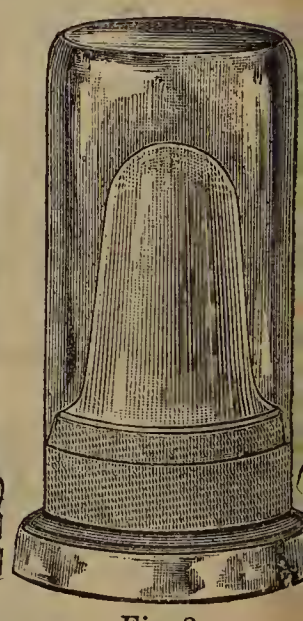

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A very good way to employ Pinol for purposes of inhalation is to pour 20 or 30 drops into half a pint of boiling water in a basin, stir well, and then add another half pint of boiling water. The steam may be readily enclosed and inhaled by surrounding the face and basin with a towel. It is considered excellent for those troubled with purulent expectoration. Pinol may also be used in a steam or spray apparatus, as a gargle (freely diluted), for fumigation, and as an embrocation and lotion. Fumigations of Pinol take precedence for pertussis. The drug may be given internally as well as applied externally. The dose for internal administration is three drops, on a lump of sugar. For cutaneous diseases it may be incorporated with Lanoline, or applied strong or diluted. In some cases a few drops are sprinkled on flannel wrung out of hot water and applied to the chest, or joint, etc.

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A not unusual method is to besmear a painful or affected part with the Pinol Extract, and then envelop it in cotton or flannel. It gives promise of much usefulness in dermatology.

SACCHARIN TABLOIDS.

$$C_6H_4 \begin{cases} C\,O \\ S\,O_2 \end{cases} N\,H.$$

Saccharin, the new and soluble substitute for sugars in diabetes, is no way allied to the carbohydrates, but is benzoyl sulphonic imide, which belongs to the class of aromatic derivatives. It possesses 300 times the sweetening power of cane sugar, and according to Prof. Stutzer, of Bonn, its sweet taste may be detected in 70,000 parts by weight of distilled water. Aducco, Mosso, Stadelman and others have shown that it is powerfully antiseptic. Physiological experiments made with it upon various species, including the frog, dog, and human beings, show that it exerts no deleterious action whatever, and is excreted from the kidneys unchanged within 24 hours after taking it, some of it appearing within 30 minutes. It allays the desire for sugar, and makes the diet of the diabetic as pleasant as if sugar were used. It is, as Sir Henry Roscoe declares, "the most remarkable of all the coal-tar products," but it is in no sense a food.

It has been prescribed in diabetes, mellitus, glycosuria, hepatic and renal affections, genito-urinary troubles (cystitis, etc.), obesity, and in many wasting diseases of children.

The favourable report upon the trials made with Saccharin by Dr. Leyden in the Berlin Hospitals have been fully endorsed by Dr. Stadelman of Heidelberg University, Prof. Salkowsky, of the Pathological Institute of Berlin, Prof. Stutzer of Bonn, and other distinguished scientific men.

Saccharin is supplied in tabloids ½-gr. each of the pure product, with sufficient soda to give it greater solubility. One or two tiny tabloids of Saccharin added to a cup of tea, coffee or cocoa—in lieu of as many lumps of sugar—will impart to it a sweet and delicate flavour, and leave a pleasant remembrance on the palate.

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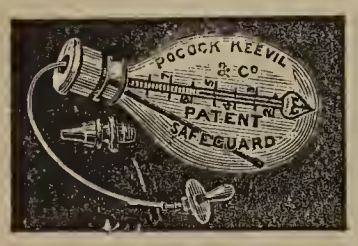

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NOTES ON SACCHARIN.

BY EDWARD D. GRAVILL, F.C.S., F.R.M.S.

Now that a supply of this reputed substitute for sugar has been placed upon the London market, it will doubtless have attracted the attention of many pharmacists, and as information, having reference to its characters and properties, is as yet somewhat scarce, the following notes may be of interest.

The sample to which these notes refer represents, I believe, a portion of the first supply that has been offered to us as a commercial article, and may therefore be taken to represent the same as it at present occurs in commerce. I think it desirable to call attention to this fact, because of the wide difference I have seen in other samples obtained, I think, by special request some weeks ago, and which do not favourably correspond with the sample under consideration, being much more highly coloured, and in comparison having a very strong odour. Saccharin now occurs as a very pale yellow, nearly white, amorphous powder, free from grittiness, but giving a distinct sensation of roughness when rubbed between the fingers. It is not entirely free from odour, but this is very slight, and not at all objectionable, reminding one of a very slight flavour of essential oil of almonds. Its taste is intensely sweet and persistent, which in the raw state is followed by a slight harshness upon the tongue and palate. The sweetness is very distinct when diluted to 1 in 10·000. Under the microscope it presents no definite form of crystallization. A temperature of 100° C., even if continued for some time, has no perceptible effect upon saccharin; it loses no weight, and undergoes no physical change. It fuses at a temperature of from 118° to 120° C., and at 150° C. forms a clear light yellow liquid, which boils a few degrees higher. At the latter temperature dense white fumes appear, and a condensation of tufts of acicular crystals (some well defined) is found upon the cool surface of the apparatus. These crystals, except for a slight sweetness of taste, correspond in characters and tests to benzoic acid. The sweet flavour, I think, may be due to the presence of a very small quantity of undecomposed saccharin, carried mechanically with the fumes. The escaping vapours, which are very irritable, and give a more decided odour of hydride of benzole than the powder itself, also communicate a very distinct sensation of sweetness to the back part of the palate. Heated over the flame, with free access of air, saccharin carbonizes and burns with a dull yellow smoky flame, leaving a residue amounting to 0·65 per cent. of sodium salts. It does not reduce an alkaline copper solution, but, like glycerine, liberates boracic acid from borax, the latter salt dissolving saccharin readily in aqueous solution, due no doubt to a displacement of the boracic acid.

The strong acids, either hot or cold, show no characteristic colour reaction; the compound enters solution at the boiling point of the acid, and in the case of hydrochloric, shows a white granular separation on cooling. Sulphuric acid develops an uncharacteristic light brown colour.

The compound, like most of the organic acids, shows a characteristic reaction with ferro- and ferridcyanide of potassium. In the former case no change is perceptible until boiled, when a greenish-white turbidity appears with the liberation of small quantities of hydrocyanic acid. In the latter case a trace also of this acid is set free, with the formation of a very distinct green solution, the latter reaction being very perceptible with a few drops of a 1 in 1000 solution of saccharin in water. Heated with lime very distinct odours of benzoic aldehyde are developed.

Saccharin possesses very decided acid properties, and combines readily with alkalies or alkaline carbonates, forming anhydro-ortho-sulphamine-benzoates of the same, in the latter case at the expense of the carbonic anhydride, causing strong effervescence. These combinations are very soluble in water, the alkaline carbonate thus forming a ready medium for the solution of this acid, which alone is so sparingly soluble. Another advantage of some importance is, that, while the harshness of flavour perceptible in a simple solution of the acid is destroyed, the great sweetness appears to be distinctly intensified and refined.

The following shows the solubility of saccharin in the various liquids quoted, all, with the exception of the boiling water, being taken at 60° F.:—

Boiling water.	0·60	parts per 100 by volume.		
Cold „ .	0·20	„	„	„
Alcohol ·800 .	4·25	„	„	„
Rectified spirit ·838 .	3·20	„	„	„
Ether ·717 .	1·00	„	„	„
Chloroform 1·49 . . .	0·20	„	„	„
Benzene . .	0·40	„	„	„
Petroleum ether insoluble.				

It is also sparingly soluble in glycerine and fixed oils, and to a greater or less extent in volatile oils. Benzoic aldehyde dissolves saccharin in large quantities.

I was somewhat disappointed at the slight solubility of saccharin in ether, as it has been repeatedly stated to be very soluble in that liquid.

The quantity of saccharin required to communicate an agreeable degree of sweetness, like sugar, differs with the material to be sweetened; but from half to one-and-half grains, according to taste, will be found sufficient for an ordinary breakfast cup full of tea or coffee infusion.

Laboratory, 300, *High Holborn*.

HYDROQUININE.*

BY DR. O. HESSE.

(*Concluded from page* 254.)

Hydroquinine hydrochlorate $C_{20}H_{26}N_2O_2HCl + 2H_2O$ forms long flat prisms very soluble in water and alcohol, but insoluble in ether. The platinochloride $(C_{20}H_{26}N_2O_2)_2PtCl_6H_2 + 3H_2O$ is a yellow amorphous precipitate very sparingly soluble in water and alcohol. The acid salt $C_{20}H_{26}N_2O_2PtCl_6H_2 + 2H_2O$ is a flocculent precipitate insoluble in water and but slightly soluble in hydrochloric acid.

The acid gold salt $C_{20}H_{26}N_2O_2 2AuCl_4H + 2H_2O$ is amorphous and almost insoluble in water.

The hydrargyrochloride $(C_{20}H_{26}N_2O_2HCl)_2HgCl_2$ forms small flat needles.

The hydrobromate $C_{20}H_{26}N_2O_2BrH + 2H_2O$ crystallizes in needles and is readily soluble in water and alcohol. The acid salt $C_{20}H_{26}N_2O_2(BrH)_2 + 3HO_2$ crystallizes in long needles and is very soluble.

* Abstracted from an article in the *Annalen der Chemie*, vol. ccxli., p. 255.

The hydriodate separates on mixing solutions of the hydrochlorate and of potassium iodide as an oily mass which gradually solidifies, but does not become crystalline. It is soluble in water, but less soluble in potassium iodide solution. The acid salt—

$$C_{20}H_{26}N_2O_2(IH)_2+4H_2O$$

is formed by dissolving the above precipitate in an acid or on mixing the acidified water solution of a hydroquinine salt with potassium iodide solution. It crystallizes in brilliant yellow needles, readily soluble in hot water and giving a colourless solution, from which the yellow salt separates again on cooling. When the alcoholic solution of this salt is mixed with iodine solution flat needles of fine metallic lustre are gradually deposited, which appear to have the composition $C_{20}H_{26}N_2O_2,2(IH,I_2)+H_2O$.

The hydrosulphocyanate is a resinous precipitate that dissolves in water, but not in a solution of potassium sulphocyanide.

The acetate $C_{20}H_{26}N_2O_2,C_2H_4O_2+5H_2O$ crystallizes in small needles, and is readily soluble in water and alcohol.

The benzoate $C_{20}H_{26}N_2O_2,C_7H_6O_2$ is crystalline, and sparingly soluble in water, but readily soluble in alcohol.

The salicylate $C_{20}H_{26}N_2O_2,C_7H_6O_3$ can be obtained in a similar manner. It forms small colourless needles, which are soluble with great difficulty in cold water, fairly soluble in hot water and freely soluble in alcohol. It contains no water of crystallization.

The oxalate $(C_{20}H_{26}N_2O_2)_2,C_2O_4H_2+6H_2O$ forms long brilliant needles, sparingly soluble in cold water, readily in hot water and in alcohol, but insoluble in ether.

Hydroquinicine.—When dried hydroquinine sulphate is fused by heating it to 140° C., the alkaloid is converted into amorphous hydroquinicine without alteration of weight and without change of composition. To obtain the base the melted mass should be dissolved in water, and the solution shaken with caustic soda and ether. The residue left on evaporating the ether, when dissolved in alcohol and neutralized with sulphuric acid, yields on evaporation the sulphate in a crystalline form. By pressing the crystals between bibulous paper they can be separated from the thick brown mother liquor. Hydroquinicine dissolves readily in ether, alcohol, chloroform and dilute acids. The solution containing three molecular proportions of hydrochloric acid to one of base, gives with $p=3$ and $t=15°$ C. $(\alpha)_D=-17°$. A solution in excess of dilute sulphuric acid has an intense green colour; on addition of chlorine water and ammonia it gives a yellowish green coloration, but no fluorescence, and it resists for some time the action of potassium permanganate, though to a less degree than a solution of hydroquinine.

Hydroquinicine is a powerful base, neutralizing acids completely and forming with some crystallizable salts. Caustic soda and potash, as well as ammonia, produce in aqueous solutions of the salts resinoid precipitates, which gradually redissolve in solutions of ammonia or ammoniacal salts, but not in solutions of the fixed alkalies. When an ether solution of the base is gradually mixed with an ether solution of oxalic acid, neutral hydroquinicine oxalate is formed as an amorphous brown mass that dissolves readily in chloroform, and in this respect there is a marked distinction between hydroquinicine and quinicine, the oxalate of which forms in the same conditions a voluminous precipitate consisting of very minute needles.

The neutral hydroquinicine sulphate obtained as above mentioned forms delicate colourless acicular crystals, dissolves very readily in alcohol and water, the water solution being faintly yellow, and on addition of some sulphuric acid assuming an intense green yellow colour.

The neutral hydrochlorate is amorphous; its water solution slightly acidified and mixed with platinic chloride gives a pale yellow flocculent precipitate of platinochloride, $C_{20}H_{26}N_2O_2$, $PtCl_6H_2+H_2O$, which soon changes into orange-coloured crystals that are insoluble in water, and but sparingly soluble in dilute hydrochloric acid.

Behaviour of Hydroquinine with Reagents.—When hydroquinine dissolved in alcohol was mixed with a molecular proportion of methyl iodide, and the solution, after standing twenty-four hours at the ordinary temperature, evaporated, a crystalline mass, separated from the dark brown liquor, consisting of hydroquinine methyl iodide, $C_{20}H_{26}N_2O_2CH_3I$, combined with one molecule of alcohol. On separating the crystals by pressure, and crystallizing from alcohol, the compound was obtained pure. It dissolves readily in boiling alcohol, less freely in cold alcohol, and is insoluble in water. It melts at 218° C. The methyl iodide combines in like manner with methyl alcohol. By treating the iodide with argentic chloride and hot water a solution of the chloride, $C_{20}H_{26}N_2O_2CH_3Cl+2H_2O$, is obtained which forms long needles that are readily soluble in hot water, slightly in cold water, and freely soluble in alcohol or dilute acids. On mixing an acidified water solution of the chloride with platinic chloride a yellow flocculent precipitate of the acid platinochloride $(C_{20}H_{26}N_2O_2CH_3)PtCl_6H_2+2H_2O$, is produced, which soon changes to bright orange-coloured acicular crystals. A neutral salt $(C_{20}H_{26}N_2O_2CH_3)_2PtCl_6$ is obtainable by mixing a hot water solution of the chloride with sodium platinochloride. It forms pale yellow needles sparingly soluble in alcohol and in water.

The neutral sulphate is obtainable by treating the iodide or chloride with an equivalent proportion of argentic sulphate. It crystallizes from water in long efflorescent needles, and from alcohol in short brilliant flat prisms. The water solution becomes fluorescent on addition of sulphuric acid, and with chlorine water and ammonia it gives an intense green coloration, but no precipitate when mixed with ammonia or caustic soda. For obtaining the base in a free state the sulphate was decomposed with the requisite quantity of baryta water, and the clear solution evaporated over sulphuric acid left an almost colourless resinoid residue of hydroquinine methyl hydroxide, readily soluble in water or alcohol, but insoluble in ether and chloroform. The base absorbs carbonic acid from the air; its alcoholic solution has a caustic action upon the skin; it turns red litmus paper blue, but has no action upon phenolphtalein.

By heating hydroquinine with acetic anhydride to 80° C., mixing the clear solution with water, and gradually adding ammonia until the liquid has only a faint acid reaction acetylhydroquinine—

$$C_{20}H_{25}(C_2H_3O)N_2O_2$$

is formed. It may be separated by shaking the cold liquor with ether and ammonia, and on evaporating the ether solution it remains as a colourless varnish-

like mass. It melts at 40°, dissolves readily in ether, alcohol, acetone and in acid, but very sparingly in water or ammonia solution. The solution containing three molecular proportions of hydrochloric acid gives with $p=3$ and $t=15°$ $(\alpha)_D=-73{\cdot}9$. On the addition of chloride of lime solution and ammonia an intense green coloration is produced. A solution in dilute sulphuric acid has a blue fluorescence, and when not too dilute it gives with ammonia or caustic soda solution a resinoid precipitate, which is rapidly converted into hydroquinine and acetic acid by the action of caustic alkali on the alcoholic solution. A solution of acetylhydroquinine in dilute hydrochloric acid mixed with platinic chloride gives a precipitate of the platinochloride $C_{20}H_{25}(C_2H_3O)N_2O_2PtCl_6H_2+2H_2O$, sparingly soluable in dilute hydrochloric acid. The neutral sulphate $[C_{20}H_{25}(C_2H_3O)N_2O_2]_2SO_4H_2+9H_2O$ crystallizes in needles, readily soluble in boiling water or alcohol, sparingly in cold water, and insoluble in ether. The moderately concentrated hot solution gives no precipitate with seignette salt or neutral potassium oxalate, with potassium chromate a resinoid precipitate, and with potassium picrate a yellow flocculent precipitate.

According to observations made with hydrocinchonidine,* it was probable that hydroquinine heated with hydrochloric acid, 1·125 sp. gr., might lose a methyl group and form hydrocupreine $C_{19}H_{24}N_2O_2$, and that was found to be the case. A mixture of hydroquinine sulphate with eight times as much hydrochloric acid, heated for eight hours in a closed tube to 140° or 150° C, yields on cooling a crystalline mass of hydrocupreine hydrochlorate $C_{19}H_{24}N_2O_2(HCl)_2+H_2O$ and methyl chloride escapes on opening the tube. To purify this base excess of caustic soda is added, and the unaltered hydroquinine removed by shaking with ether. The alkaline liquor containing the hydrocupreine is then neutralized with sulphuric acid, and the crystalline hydrocupreine sulphate collected on a filter, washed, and dissolved with hydrochloric or sulphuric acid, and the base precipitated by ammonia. An ether solution of the base leaves it on evaporation as a varnish-like residue ; but the base precipitated by ammonia is a crystalline powder containing $2H_2O$, which is given off at 100° C.

Hydrocupreine dissolves readily in ether, chloroform, or alcohol, slightly in water, to some extent in ammonia solution, and readily in caustic soda or potash. It cannot be extracted from the latter solutions by ether, but from an ammoniacal solution ether takes it up completely, though not easily. The alcoholic solution, as well as solutions of neutral salts, gives a dark brown coloration with ferric chloride. The base melts at 168° or 170° C., has a strong alkaline reaction, and forms with acids crystalline salts, which give greenish-yellow solutions when neutral, and when acid, colourless solutions. The solution in dilute sulphuric acid is not fluorescent, but with chloride of lime and ammonia it gives an intense green coloration. The acid solution of hydrocupreine is not easily acted upon by potassium permanganate.

Hydrocupreine sulphate $(C_{19}H_{24}N_2O_2)_2SO_4H_2$ is best obtained by neutralizing the hot water solution of hydrochlorate with ammonia and then adding sodium sulphate. The salt separates on cooling, and is sparingly soluble in hot or cold water or alcohol.

* Liebeg's *Annalen*, ccxiv., 1.

The tartrate $(C_{19}H_{24}N_2O_2)_2C_4H_6O_6+2H_2O$ forms acicular crystals, and is very sparingly soluble in hot or cold water.

The dihydrochlorate already mentioned is very soluble in water, but less so in hydrochloric acid. The acicular crystals of the salt retain their form when the mother liquor is rapidly separated from them, but if this is not done quickly they change into rhombic octahedrons. The composition of the salt is the same in both forms

The acid platinochloride $C_{19}H_{24}N_2O_2,PtCl_6H_2$ is an orange red crystalline precipitate almost insoluble in water or dilute hydrochloric acid.

When hydroquinine sulphate is heated with excess of sulphuric acid containing 25 per cent. H_2SO_4 to 140° C. for several hours, the base does not undergo alteration and no hydroquinicine is formed. Another effect is produced when the base is dissolved at the normal temperature in ordinary oil of vitriol, and on diluting with water and nearly neutralizing with ammonia hydroquinine sulphonic acid

$$C_{20}H_{25}N_2O_2SO_3H+H_2O$$

separates in crystals, this product being formed according to the equation—

$$C_{20}H_{26}N_2O_2+SO_4H_2=C_{20}H_{25}N_2O_2SO_3H+H_2O.$$

It is remarkable that hydrocinchonidine and hydroquinidine are the only other cinchona bases which behave in the same manner. The acid is insoluble in ether or chloroform, and at the normal temperature it is but sparingly soluble in ammonia or caustic soda solution. On heating, however, it dissolves readily, and then is not separated again until the solution is neutralized with aniseed. The ammoniacal solution gives no precipitate with barium chloride or argentic nitrate. The acid dissolves readily in dilute acids, and is again precipitated by ammonia. The solution in dilute sulphuric acid has a blue fluorescence and gives an intense green coloration with chloride of lime and ammonia. The dried acid melts at 239° C. and becomes dark coloured ; it has an intensely bitter taste, and does not reduce permanganate either in acid or alkaline solution. It combines with acids, forming crystalline compounds. A hot water solution of the hydrochloric acid compound mixed with platinic chloride solidifies on cooling to a cheesy mass consisting of pale yellow needles $(C_{20}H_{25}N_2O_2SO_3H)_2PtCl_6H_2+8H_2O$.

From what has been stated above it is evident that hydroquinine has a very close chemical relationship to quinine. From its saturated condition it is less susceptible to alteration by reagents, and it is no doubt owing to this circumstance that the elimination of the methyl group by the action of hydrochloric acid takes place without metamorphosis of the molecule, while in the case of quinine there is transformation into apoquinine to which a molecule of HCl is then added.

The great similarity between corresponding compounds of quinine and hydroquinine appears also to find expression in the antipyretic action which the two bases exercise upon the human organism, for Dr. Burkart, who has made numerous observations with hydroquinine sulphate, informs me that in this respect it acts exactly like quinine. Hence it would appear that hydroquinine is an advantageous associate of quinine, as Kerner and Weller have already suggested, and that its separation would at least be only a waste of time and labour.

It was naturally a point of interest to ascertain

whether hydroquinine existed as such in cinchona bark, or whether it was produced in the preparation of quinine. With that object I have exposed pure quinine in different solutions to the influence of the various metals with which it may be brought into contact under those conditions, but without obtaining in this way any hydroquinine. In a check experiment the preparation of quinine was carried out in vessels of glass and porcelain, and in this instance the quinine obtained did contain hydroquinine. It follows, therefore, from these results that hydroquinine exists naturally in cinchona bark, and that it is not produced in the process of manufacture.

The amount of hydroquinine occurring in cinchona bark is certainly small; in proportion it varies also, and no constant relation is to be found between it and quinine. Apparently it is more abundant in the bark of cultivated cinchonas than in the bark of uncultivated trees. Sometimes it may be determined in bark by the polarimeter, and indeed with one observation in the case where the tartrate precipitate consists only of quinine and hydroquinine, as, for example, in some kinds of Ledger bark. But with most bark this determination is impracticable without further observations, because they contain cinchonidine and hydrocinchonidine, especially the former, and the tartrate precipitate will contain both of these bases to some extent. The same remark applies also to the normal commercial quinine sulphate. But since the cinchonidine in this preparation is as a rule reduced to a very small proportion by crystallization, and at the same time the hydroquinine, which does not amount to more than one-twentieth of the cinchonidine, is reduced to very small amounts, the polarimetric determination of the three bases, quinine, hydroquinine, and cinchonidine mixed together would not be altogether an impossibility. For that purpose two observations would have to be made by examining the tartrates, first in hydrochloric acid solution and then a solution in a mixture of chloroform and alcohol. In such a case the calculation might be made according to the plan which has been previously suggested by me as follows:—

$$x+y+z=1$$
$$a'x+b'y+c'z=(a)'$$
$$a''x+b''y+c''z=(a)''$$

in which x, y and z represent the quantities of the respective tartrates in the mixture; a', b', c', the rotatory powers of the pure tartrates; $(a)'$, that of the mixture in hydrochloric acid of defined concentration; and a'', b'' c'' and $(a)''$, the rotatory powers of the same quantities dissolved in a mixture of chloroform and alcohol.

Such a determination, however, in the case now referred to, cannot make any claim to great accuracy, because the deviation caused by hydroquinine is nearly intermediate between that caused by quinine and cinchonidine. Besides this, since there is only a moderate difference between the deviation of quinine and that of cinchonidine, and since in the case of normal quinine sulphate of commerce it is only proportionately small quantities of cinchonidine and hydroquinine that have to be determined, a very small error may suffice to affect the results very materially. This is also the reason that I have not been able to recognize the applicability of this indirect mode of determining the three alkaloids in question, when mixed together, however well founded it may be from a theoretical point of view.

ARCO AS A HEALTH RESORT.*

Arco is less than four miles distant from Riva, at the head of Lake Garda, and about ten miles from Mori, on the line of railway between Botzen and Verona. It may be reached by coach from Trent, as well as from Riva and Mori. It is situated on the right bank of the river Sarca, which falls into Lake Garda at Torbole. The valley in which it lies is shut in on all sides but the south with mountains rising from four to seven thousand feet, and the northern opening through which the river runs is blocked by a mass of rock 370 feet high upon which stands the ruined castle of the Counts of Arco. This mass breaks the current of wind from the north. Another elevation, called Monte Brione, breaks the force of the wind blowing from the opposite direction. Thus Arco is sheltered from severe blasts, and its almost windless character is one of its boasts and attractions. It is noted also as a place where little rain falls. Yet, though the air is still and dry, there is no sensation of closeness, as is the drawback in many mountain valleys. The Sarca valley is spacious enough both for air and locomotion, its length being about four miles and the breadth about three. All the ground is under cultivation. Not a morsel is left untilled between Arco and Riva, the crops being grapes, maize, and mulberries, and as the maize and mulberries are cultivated between the rows of vines, the aspect is that of a most fruitful and prolific land. On the slopes behind the houses are hundreds of olive trees, and the olive oil expressed from the fruit is said to be of excellent quality. It is rather hastily inferred that the presence of olive trees is a sign that the climate is very mild. Now, olive trees flourish near Avignon, in Provence, yet the winters at Avignon are not balmy. It is probable that a low temperature is less felt at Arco than in less sheltered spots, and thus it may be a pleasant place in the winter time even when the temperature is not high.

Statistics drawn from observations extending over ten years show that the invalid at Arco can count upon spending several hours a day in the open air. During these hours it is assumed that the sun shines, and that the conditions are suitable for walking or sitting out of doors, the early morning and the hours after sunset being excluded from the calculation. It appears, then, that the invalid's day, as it is called, is nine hours long in October, seven in November, six in December, five in January, six in February, eight in March, and the whole time between sunrise and sunset in April.

In the English translation of a German pamphlet about Arco, issued by a committee chosen to make its advantages known and render it attractive to invalids, it is said that "Arco is well suited as a residence for persons suffering from affections of the chest and throat, from want of blood, want of appetite, rheumatism, gout, paralysis, nervousness, chronic catarrh of the stomach, intermittent fever; also for those recovering from illness or disposed to consumption, for weakly, scrofulous, ricketty children." From this it will be seen that many persons are included among the number of those who will benefit by a sojourn at Arco. Nine medical men practise there during the winter, and two apothecaries dispense medicines all the year round. One of the forms of treatment regularly carried out here is scarcely known in England; it has been devised by Professor Oertel, and it is called the "Terrain Cur." I fancy that some persons would translate this "earth cure," and they might be excused for doing so, and also for supposing that it referred to a method of partial burial in the ground like that which has been practised at different times and places. But the clumsy and obscure phrase has quite another meaning, and it implies a mode of treatment by taking walks. Walking about for the sake of one's health is nothing very new; but then German physicians are skilled in turning an old thing to a new account and proclaiming

* Extract from a series of articles on "Austrian Health Resorts" in the *Times*.

that they have made a discovery. Patients, it must be admitted, take kindly to old things under fresh aspects. Tell an invalid to walk for an hour daily, and he will not greatly value the advice ; but tell him to try the "Terrain Cur," and he will gladly make the experiment, though all he does is to walk for a stated time. In order that this kind of treatment may be conducted with a due regard for appearances, the principal walks around Arco, as at other places where the "Terrain Cur" is in vogue, are carefully numbered. Coloured signboards at every turning serve to indicate each particular walk. It is said that by this classification and regulation of the walks the suitable amount of exercise can be prescribed to and taken by a patient, that the weak are not likely to overexert themselves, and the strong are as little likely to suffer from insufficient muscular exertion. It is said, moreover, that many forms of illness can be successfully treated in this fashion. What is beyond doubt is that the "Terrain Cur" gives a medical man an additional hold upon his patient. Besides ordering a patient what he is to drink, eat and avoid, what medicine to swallow, and what hours to keep, where and how to live, the physician who prescribes the "Terrain Cur" can also exercise a strict control over his walks abroad.

The committee which acts at Arco in the interests of the visitors is a body almost unknown at some health resorts elsewhere, and is never heard of at such places in this country. Its functions and its constitution deserve to be better known, and, as I have before me a copy of the statutes governing that of Arco, I may extract from it the salient and more interesting points. It is necessary for a place to be authoritatively recognized as a health resort before such a committee can be formed, and after a place ceases to be so recognized then the committee ceases to exist. At Arco the committee consists of eight persons, who serve for three years, the *podesta*, or mayor, being one and acting as chairman. The duties of the committee are defined as consisting in—first, doing everything that is required for attracting visitors to Arco; secondly, improving the place generally and rendering it more agreeable to the public, supporting and encouraging musical performances and other kinds of amusements; thirdly, publishing advertisements and causing articles to be inserted in newspapers; fourthly, providing for the supply of German physicians; fifthly, arranging for the collection and employment of the tax upon visitors and others who are liable to pay it; sixthly, encouraging the grape, milk, and whey cure; seventhly, reconciling disputes between visitors and the inhabitants; eighthly, doing whatever may be required to render the place more popular as a health resort. I need not reproduce the minute directions which are laid down for carrying out these objects. It is sufficient to add that each visitor who stays longer than four days is bound to contribute 2 fl. a month to the fund at the disposal of this committee, that children under twelve pay half that sum, and the servants of visitors one-fourth. The poor who can show that their means will not permit of any payment are exempted from taxation. As a result of this arrangement such a place as Arco is rendered much more attractive than it would otherwise be ; a good band of music plays daily for the delectation of those who have nothing better to do than to listen, while the grounds and public gardens are kept in excellent order. If no such committee existed the visitors would have frequent occasion to complain ; owing to the action of such a committee many persons are attracted to Arco. Had it not been for the documents issued by the committee, one of which fell into my hands, I might not have visited it. I think that the account which I have given of the existence and action of such a committee may be fitly supplemented with a useful moral. In England there are several places which have as genial a climate in winter as Arco Meran, and many of the small towns on the Riviera. Yet they are little known, and as places of residence they lack the attractions which gratify invalids. A small sum of money expended in making them better known and better worth visiting would be speedily and amply repaid by an influx of visitors. I refrain from mentioning names, but I assert with confidence that from the Isle of Wight to Penzance there are eight health resorts which only require a little judicious supervision and notice to become quite as popular among those who wish to forget the winter months amid bright sunshine and blooming flowers without leaving their native land. A little organization on the Austrian model would make many English health resorts as much appreciated as they deserve to be.

Judging from my own observation and from the testimony which I have collected, I should pronounce Arco a pleasant place wherein to spend the winter months. It is improbable that those who are in an advanced stage of consumption can derive that benefit here which is unprocurable elsewhere. For those who are very sensitive to cold it may be less suitable than some parts of the Riviera, or than Egypt, Algeria, and Madeira. Yet, to the large class who spend a part of the winter in the South of Europe because they wish to enjoy a more genial climate than that of London, and who are delicate but not seriously ill, a sojourn at Arco may be confidently recommended. For such visitors it would have the charm of novelty as well as other attractions. The season begins on September 1 and ends on May 1. Enthusiastic writers may exaggerate and mislead readers in depicting Arco as an earthly paradise. Still, if but a part of what they state in its praise be well-founded, it resembles paradise during the winter months quite as closely as any reasonable person has a right to expect to find in that part of the earth which is included within the Empire of Austria.

NOTES ON CHINESE MATERIA MEDICA.*

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(*Continued from page* 322.)

9.—DATURA STRAMONIUM, Linn. Thorn apple, stramonium. N. O. Solanaceæ.—According to David this species grows around Pekin, and at Yéhol in Mongolia. We have not met with a specimen, but the botanical differences between it and *Datura alba* are not such as to render it at all probable that the Chinese distinguish the two.

Our view, that both plants will be found in China under the same or closely allied names, derives support from the fact that in Tatarinov's catalogue (No. 177), *D. Stramonium* is given under *Fu ch'ieh êrh*, a name which, as pointed out by Porter Smith, may either be a mistake or a popular change for *Fêng ch'ieh êrh*, one of the synonyms of *Wan t'o lo hua* (*Datura alba*).

'Porter Smith,' p. 84 ; 'Soub. et Dab. de Th.,' p. 190 ; 'Plantæ Davidianæ' (1884), p. 221 ; 'Med. Plants,' iii., 192 ; 'Pharmacographia,' 459 ; 'Per. Mat. Med.,' vol. ii., Pt. I., p. 561.

10.—PODOPHYLLUM VERSIPELLE,† Hance. N. O. Berberideæ. Chinese name, *Tu chio lien*.—The discovery a few years ago of two Chinese species of podophyllum—one in Formosa, *P. pleianthum*,‡ and the other in the Kwangtung province—affords another illustration of the relationship which exists between the flora of China and that of the United States.

The sole habitat of the species now noticed is the Lofau mountains, situated about fifty miles to the N.E.

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* Reprinted from advance sheets of the *China Review*, communicated by the authors.

† *Journal of Botany* (1883), p. 362.

‡ *Ibid.* (1883), p. 175.

of Canton, where it has been seen growing at an altitude of about 3000 feet.

As a drug it is consequently rare ; the specimens purchased by us some time ago of an itinerant Loufaushan medicine vendor, who happened to be in Hong Kong, consisted of portions of the rhizome and rootlets, with petiole and leaf attached.

The nearly orbicular peltate leaves are about six or seven inches in diameter; the petiole is from twelve to fourteen inches long.

The use of the entire plant as a medicine seems to be restricted to the treatment of snake bites, bruises and sprains.

We are unable to refer with certainty to any native work mentioning this drug. Both the 'Pên ts'ao' and 'Chih wu' have descriptions and figures of a plant under the name *Tu chio hsien*,* which do slightly resemble the characters of the Lofaushan species podophyllum ; but it remains to be proved whether or not the two plants are identical. The *Tu chio hsien* of the 'Pên ts'ao' and 'Chih wu' is said to grow on the mountains at the back of Foochow.

'Ind. Flor. Sinens,' p. 33 ; *Pharm Journ.*, [3], xiv., 504 ; 'Annual Report for 1883 of Director of Hongk. Bot. Gard,' in *Hongk. Gov. Gaz.*, vol. xxx., p. 471.

11.—ABUTILON INDICUM,† G. Don. N. O. Malvaceæ. Syn., *Sida indica*, Linn., et *S. asiatica*, Linn. ; *Abutilon cysticarpum*, Hance ; *A. graveolens*, Seem. Chinese name, *Tung k'wei tzŭ*.‡ 'Pên ts'ao,' ch. xvi., fig. 273 ; 'Chih wu,' pt. I., ch. iii., p. 5 ; pt. II., ch. iii., p. 1.

Habitat.—*Abutilon indicum* has been found by European botanists in the Shantung, Chekiang and Kwangtung provinces of China ; also in Hong Kong. It is a native of tropical Asia, Africa and Australia.§

Description, etc.—The *Tung k'wei tzŭ* of Chinese druggists have been regarded by some as identical with musk seeds, derived from *Hibiscus Abelmoschus*, Linn.‖ In 1885 specimens from the drug shops were sown in the Botanic Gardens, and the plant turned out to be *A. indicum*. The seeds are ear-shaped, slightly compressed, two lines long, and measure one-eighth of an inch at the broadest end ; one hundred weigh 23 grains. The testa is hard, of a dull brown colour, having a rather scurfy appearance under the microscope, non-hairy. Immature specimens are often distinctly cordate or reniform, with a marked depression in the centre. There is not the slightest odour of musk about them, not even when they are bruised.

Uses.—According to the Chinese in Hong Kong the seeds are employed as an emollient and demulcent ; the root is used as a diuretic and pulmonary sedative, and the flowers and leaves as a local application to boils and ulcers. Porter Smith states¶ that the seeds and the entire plant are used "as demulcent, lenitive, diuretic, laxative and discutient remedies. Puerperal diseases, urinary disorders, chronic dysentery and fevers are treated with the seeds."

'Tatar Cat. Med. Sin.,' No. 169 ; Williams, 'Chin. Comm. Guide,' p. 128 ; 'Lour. Flor. Cochin,' p. 514 ; Dymock, 'Mat. Med. of W. India,' p. 82.

12.—FŒNICULUM CAPILLACEUM,** Gilib. Fennel. N. O. Umbelliferæ. Syn., *Anethum Fœniculum*, Linn. ; *Meum Fœniculum*, Spreng. ; *Fœniculum vulgare*, Gaertn. ; *F. officinale*, All ; *F. sativum*, Bertol. ; *F. Panmorium*, De C. ; *F. dulce*, De C. Chinese names, *Huai hsiang*, *Hui hsiang* ; also known as *Hsiao hui hsiang* (*i.e.*, small *Hui hsiang*) to distinguish it from *Ta hui hsiang* (*i.e.*, large *Hui hsiang*), the star anise.

'Pên ts'ao,' ch. xxvi., fig. 572 ; 'Chih wu,' pt. I., ch. v , p. 3 ; pt. 2, ch. iv., p. 12.

The Chinese evidently observe some resemblance between the odour of fennel fruits and that of star anise, for in both the 'Pên ts'ao' and 'Chih wu' the fruits of *Illicium anisatum*, under the name *pa chio hui hsiang* (*i.e.*, eight-cornered *Hui hsiang*), are described along with fennel.* We are of opinion that Dr. Porter Smith is wrong in inferring (p. 18) that the Chinese confound the fruits of *Pimpinella Anisum* with those of *Fœniculum capillaceum*. The umbelliferous aniseeds are not known to the Chinese in Hong Kong, and the description of the plant figured as above can only refer to fennel.

Loureiro mentions fennel as abundant in China,† and from the wording of his habitat note we fancy he regarded it as a native. Bretschneider, in his 'Early European Researches' (p. 154), alludes to it as much cultivated in Pekin.

The only difference observed between the Szechuen variety of fennel fruit and European-grown samples is in the former containing such a large percentage of immature specimens.

The stalks and leaves are eaten in China. The seeds are used as a carminative and in the treatment of enlarged scrotum and kidney disorders.

'Tatar. Cat. Med. Sin.,' Nos. 57 and 352 ; Bentley and Trimen (ii.), 123 ; Porter Smith, p. 97; 'Pharmacograph.,' p. 308 ; 'Soub. et Dab. de Th.,' p. 196.

NOTES ON ESSENTIAL OILS AND ALLIED PRODUCTS.‡

The October Report of Messrs. Schimmel and Co., besides dealing with market questions, contains a large amount of other interesting information respecting essential oils and allied products, from which the following statements are selected :—

Anise Oil.—The production of anise in Russia has now attained such enormous dimensions as practically to render all other sources only of nominal importance. Under the name of anisol an article is sent out which is said to be separated from the elæoptin by a cold process, the injurious influence upon the aroma of the oil resulting from the heat necessarily employed in the ordinary rectification processes being thus avoided. It is claimed that anisol represents the anise aroma in the purest and most perfect form, and that it is free from a disagreeable bye-flavour met with in all oils of anise.

Camphor Oil.—The low-boiling portion of Japanese camphor oil (sp. gr. 0·900, b.p. 175° C.) is being largely and increasingly used in various industries, its low flashing-point, 11° C. less than that of turpentine oil, contributing to bring it into favour. It also has the advantage over turpentine oil of dissolving appreciably more readily all resins, paraffin, stearin, etc., and mostly without the application of heat. According to a quotation from Simmler's 'Die tropische Agricultur,' camphor oil was formerly looked upon in Japan as nearly useless, and was only occasionally used for the dilution of lac or by the poorer people as a lamp oil. In a purified condition it is however now used most advantageously in the lac manufacture. A favourite lac in Japan is prepared

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* 'Pên ts'ao,' ch. xxxi., fig. 519. 'Chih wu,' pt. II., ch. viii., p. 61.

† 'Flora Hongk.,' p. 33.

‡ Both Loureiro and J. Russel Reeves refer this name to *Malva verticillata*, Linn.

§ 'Ind. Fl. Sin.,' p. 86.

‖ This plant is known in Pekin by the name *Ch'iu k'wei* (Bretschneider, 'Ear. Eur. Res.,' p. 63) ; in Canton by the names *Wong shuk k'wai* and *Ka yeung t'o* (Parker, 'Canton Plants,' p. 118).

¶ 'Cont. to Mat. Med.,' p. 112.

** This identification is given on the authority of Loureiro and Tatarinov.

* According to Mr. M. Sheriff fennel and anise have been confounded together in Arabic Persian works on materia medica. Dymock, 'Mat. Med. of W. India,' p. 308.

† "Habitat abundantur in China; colitur etiam in Cochinchina." 'Flor. Cochin.,' p. 226.

‡ Abstracted from the October Report of Messrs. Schimmel and Co., of Leipzic.

from 10 parts of camphor oil, 3·3 parts of turpentine oil, and 8 parts of copal resin. Paper treated with a lac prepared from colophony and camphor oil becomes very transparent. By adding camphor oil to melted asphalt a lac is obtained which gives to metal plates as fine and clear a coating as the celebrated Japanese "uruschi"; the best proportions are camphor oil 22 parts and asphalt 5 parts. Paper can be made waterproof with a mixture of camphor oil and linseed oil.

Cananga Oil, Indian.—Under this name a relatively low-priced oil is imported from Java. It is said to come without doubt from the *Cananga odorata*, the same plant as the ylang-ylang oil of the Philippines is derived from, and to which, as pointed out by Flückiger (*Pharm. Journ.*, [3], xi., 934), the name *Unona odoratissima* has been incorrectly given. The odour of the Java cananga oil cannot, however, be compared with that of the finer distillate from Manilla, though whether this is due to the Java flowers being inferior in odour, or to a defective method of preparing the oil, is not yet known.

Cardamom Oil.—The last cardamom harvest in Ceylon is said to have yielded particularly heavy and full-seeded fruit, correspondingly rich in oil.

Cedar-wood Oil.—For the economical production of this oil, which is largely used in Germany as a basis for soap perfume, the waste from the lead pencil industry is said to yield an ample supply of material. Speaking of fractionated cedar-wood oil, prepared for optical purposes, reference is made to a demand for an oil of syrupy consistence, which should be at the same time free from colour. Without affirming that such an oil could not be produced, an opinion is expressed that its preparation in small quantity would be excessively troublesome and tedious.

Citronelle Oil.—Assam appears likely to become a competitor with Ceylon in the production of this oil.

Eucalyptus Oil and Eucalyptol.—Algeria and California are now powerful competitors with Australia in the production of eucalyptus oil. It is affirmed that Algeria alone is now in the position to supply the whole world with *Eucalyptus Globulus* oil, and that a large quantity is available from California, where it is produced as a bye-product in the manufacture of an anti-calcaire preparation for boilers. The production of eucalyptus oil appears, moreover, to be increasing in Australia, where it has spread from Victoria to South Australia, whilst in Tasmania, also, a company has been formed for the distillation of different species of *Eucalyptus*. A statement made in a previous report that the Australian oil from *Eucalyptus amygdalina* contains no eucalyptol, and is inferior in this respect to *Eucalyptus Globulus* oil from Algeria and California, was subsequently challenged and stigmatized as "distinctly erroneous." Messrs. Schimmel, however, now reaffirm that statement, and say that the fraction of the amygdalina oil separable at a temperature of 176°–177° C. has a specific gravity of 0·886 at 15° C. (eucalyptol has a specific gravity of 0·930), and is probably a mixture of a terpin (eucalypten, $C_{10}H_{16}$) and a small quantity of cymol.

Geranium Oil, Turkish, or, more correctly, *Andropogon Oil.*—It is stated that the more expensive sorts of Turkish geranium or palmarosa oil, coming from Constantinople, are submitted to a special treatment which makes them especially suitable for the adulteration of rose oil; it consists in bleaching the oil in the sun and rectifying it several times over roses.

Hop Oil.—The oil distilled from Bavarian hops has now displaced that prepared from lupulin, which it excels in the presence of a fine fragrant hop odour, and the absence of the smell resembling that of butyric or valerianic acid that accompanies the lupulin oil. Hop oil is said not to possess a narcotic action, but to correspond in this respect with similar volatile oils.

Ginger Oil.—It is pointed out that this oil possesses only the odour of the ginger root and not its agreeable pungency; and that therefore it cannot take the place of ginger essence in the preparation of stomachic liqueurs.

Marjoram Oil.—A Spanish distillate of *Origanum Majorana*, which has recently been introduced into commmerce, is said to be unsuitable to replace the oil distilled from German marjoram, since it possesses quite different characters. The Spanish oil may be distinguished by its freedom from colour.

Patchouli.—The insufficient supply from India and Singapore of the patchouli herb has occasioned an attempt to acclimatize the plant in Peru.

Pepper Oil.—The price of pepper oil is said to stand in no relation to the cost of the raw material, it being now yielded as a bye-product in the preparation of piperonal (heliotropin). The oil is reported to be used exclusively in the "improvement" of spices.

Pimento Oil.—It is suggested whether this oil might not to some extent replace the dearer clove oil in perfumery, since it consists chiefly of eugenol, and the two oils are not distinguishable chemically from one another.

Tansy Oil.—Severe symptoms of poisoning are said to follow taking a teaspoonful of tansy oil, whilst death may be caused by a teaspoonful and a half.

Rose Oil.—Some further information is given as to the progress of the experiment in rose cultivation near Leipzic for the purposes of distillation. The weather during the past year was extremely favourable to the growth and harvesting of the flowers, and the yield has amounted to nearly two kilos of pure rose oil, and about 3000 kilos of rose water, prepared in the proportion of equal weights of roses and water. It is estimated that at present there are about six hectares of land under culture with roses in the neighbourhood of Leipzic, and this quantity will probably considerably increase. The German rose oil is claimed to have an uncommonly fine perfume, and to be the best now met with in commerce, and it is said that a comparison of it with the Turkish article will raise in the mind of any expert suspicions as to the latter. The Turkish oil contains a smaller quantity of the solid constituent than the German, which solidifies at about +20° C.; it would therefore be interesting to decide whether this is a result of sophistication, or whether, as has been stated, the oil from roses grown in high elevations contains less stearoptene than that from roses grown on the plains.

Rosewood Oil.—The wood from which this oil is distilled (*Convolvulus scoparius*) is superficially quite odourless, the rose-like perfume becoming perceptible in proportion with the disintegration of the wood. This would appear to indicate that the oil glands are contained in the substance of the wood, but unfortunately they are so sparingly distributed that the distillation of the oil is hardly remunerative. Moreover, the oil appears too weak in odour to be of practical importance as a perfume. It is said, however, that mixed with twenty times its weight of copaiba oil it is used as a bait for wild rabbits and rats, who are attracted by its perfume.

Sandal Wood Oil.—The wood as imported from India shows great variations in the amount of oil it contains. The best qualities come from Bombay and Tellichery, and fetch a relatively high price, the supply of root pieces being limited. A small distillate similar to the East Indian oil is yielded by the so-called Macassar sandal wood, which is brought from Timor and Sumba, the "Sandal Wood Islands," off the North-west coast of Australia, to the market in Macassar, and is thence consigned to Holland. The West Australian sandal wood, from Swan River, for which Singapore is the principal market, is said to yield an oil insufficient in quality to meet the most moderate requirements. The so-called "West Indian sandal wood oil," distilled from the wood of an undetermined Venezuelan tree, is disappearing from commerce, though it used to be imported largely into the United States. In respect to odour it is described as not having the slightest similarity to the East Indian oil, and quite useless for perfumery purposes.

The following are described as novelties:—

Betel Leaves Oil, distilled from the leaves of *Piper Betle.*—The essential oil is brown in colour and has an agreeable tea-like odour and burning taste. Specific gravity 1·020 at 15° C. It boils at 250°–260° C., and it consists of a phenol, corresponding completely in properties and reactions with eugenol, and an indifferent hydrocarbon. The betel leaves operated upon, which came from Siam, yielded about one-half per cent. of essential oil; but as, according to a statement by the consignor, the leaves had been improperly dried, it may be that they had lost a portion of their oil. If, as there is little reason to doubt, the essential oil is the active principle of the leaves, it would probably be worthy of an experimental investigation. According to the Pharmacopœia of India the leaves are useful in catarrhal and pulmonary affections generally, and especially those of children. The dose is not given, but it seems probable, judging from its composition, that the oil would be harmless, which would also appear from the long and general use of a mixture of the leaves with lime and areca nut as a masticatory in the East.

Masterwort Oil.—The essential oil from the root of *Imperatoria Ostruthium.* It has a strong aromatic odour, recalling that of angelica oil, and a pungent aromatic taste, and consists of a hydrocarbon. It boils between 170° and 190° C. Specific gravity 0·877 at 15° C. One hundred kilos of root submitted to distillation gave 800 grams of essential oil.

Musk Seed Oil.—Distillate from the seeds of *Abelmoschus moschatus.* It does not appear from published reports that this oil has been prepared or is known; nevertheless it is considered by Messrs. Schimmel of great interest, and of value in perfumery, on account of its intense and persistent odour of musk and civet. Specific gravity 0·900 at 25° C. It solidifies at a temperature below + 10° C., and contains a free fatty acid which partially separates even at the ordinary temperature. This acid is not myristic, but probably palmitic acid. In the distillation the oil partially decomposes; the distillate is strongly acid and contains free acetic and fatty acid. The oil after being freed from the fatty acid remains liquid at 0° C.

Ledum Oil.—The ethereal oil of *Ledum palustre* from the herb, specific gravity 0 932 at 15° C. Boiling point 180°–250° C. It was prepared to obtain Ledum camphor, but neither the normal oil nor the separate fractions yielded the camphor when placed in a cooling mixture. Neither was the statement confirmed that camphor is formed in the oil when it is exposed to the air. This oil was shown at the Philadelphia Exhibition, and it is said to be very active against moths; but its present high price would hardly allow it to be used for that purpose.

Celtic Nard Oil.—A distillate from *Valeriana celtica,* which grows in the Styrian Alps. This oil, which has a specific gravity of 0·967, and boils at 250°–300° C., is said to resemble in odour rather Roman chamomile oil and patchouli oil than valerian oil. Its perfume is very powerful. The root of *Valeriana celtica* was formerly an important article of Eastern trade; at present it is only obtained with difficulty, and is usually mixed with about 80 per cent. of earth adherent to its fine fibres. The root differs in external appearance from the official valerian root as much as the two oils differ from one another.

Michelia Nilagirica.—A very aromatic essential oil has been obtained from the bark of *Michelia Nilagirica,* a tree said to be distributed over all Northern India. The bark was received through London in large flat pieces of reddish colour, apparently derived from large trees. A decoction of the bark is reported to be used by the natives as a remedy for fevers. The oil is said to be well suited for perfumery if a suitable supply of the bark could be obtained.

Lemon Oil, Artificial.—Referring to statements that have been published to the effect that a colourless oil, having the odour and properties of lemon oil, can be prepared by acting on terpin hydrate with hydrochloric acid gas, and treating the hydrochlorate formed with potassium, Messrs. Schimmel say that they have failed to obtain such an oil by the process. But even if it were otherwise they consider the process would have no practical importance, since the oil produced by it would be five times more costly than the natural oil.

Coumarin.—Some surprise is expressed that coumarin does not more rapidly supersede the tonka bean, 15 grains of coumarin being represented as equal to a kilogram of the beans.

Heliotropin or Piperonal.—Respecting this synthetical substance, which is said to be increasingly used in perfumery, and which has been recommended as an antiseptic and antipyretic, a caution is given that in summer it should be kept in a cool place. The preparation melts at about 37° C., and in the melted condition is quite worthless.

Thymol.—It is pointed out that in the event of any insufficiency in the supply of Indian ajowan seeds, the material from which thymol is ordinarily prepared, there would be a good substitute available in the American horse-mint or monarda oil, the distillate of the herb *Monarda punctata.* Thymol is said to be establishing a firm place in dental preparations, and a mouth wash, made by adding ten drops of a 1 in 10 spirituous solution to a glass of warm water is spoken of very highly. In the United States thymol is said to be in use for the disinfection of closets. The thymol is allowed to stand in contact a short time with the water used for flushing, and although it is very difficultly soluble in water (1 in 1000) enough is taken up to impart to the flushing water a slight thymol odour.

(*To be continued.*)

THE COLOUR OF COLOURED LEAVES.

Dr. T. W. Engelmann has investigated the cause of the colour in coloured leaves where the colouring is normal. He finds it due to two different causes:—a variation in the colour of the assimilating chlorophyll-grains, and the occurrence in the leaf of special pigments in addition to the normal chlorophyll. In the first case the colouring matter appears to be invariably of a light shade, and either pure yellow or yellow-green, with every transition between this and ordinary chlorophyll green; in the second case it is usually red-brown, dark purple-brown, purple-red, or violet.

In the first group of cases the proportion of colouring substance is often nearly uniform in the same species. In the yellow variety of the elder the tint does not appear to be due to a pure xanthophyll, but to a mixture of chlorophyllan with a small quantity of true chlorophyll. In more refrangible light (about $\lambda = 0{\cdot}53\ \mu$) the yellow cells decompose relatively, if not absolutely, more carbon dioxide than the green cells do; while in red and green light, the green cells decompose, both relatively and absolutely, more than the yellow.

In the second group the seat of the pigment is usually tha cell-sap, less often the cell-wall; in the latter case the colouring is mostly confined to small portions of the surface, causing variegated leaves, as in the zonal pelargoniums. Of leaves coloured by soluble pigments, Dr. Engelmann has examined about fifty kinds. These may be divided into two sections, connected with one another by intermediate forms; those in which the leaves are normally coloured during the whole or the greater part of their existence, and those which are coloured only when young. In both these cases the colouring is usually, but not always, spread over the whole surface of the leaf. That cells containing a purple sap can decompose carbon dioxide as energetically as those which contain pure chlorophyll is shown by the vigour exhibited by the copper-beech, the various species of *Coleus,* etc.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 22, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MERCHANDISE MARKS ACT.

THOUGH the Merchandise Marks Act passed during the last session of Parliament applies more especially to those branches of trade in which goods are sold bearing the particular trade marks which belong to individual manufacturers, there are some parts of the Act which might, in their strict sense, admit of application to transactions of every-day occurrence in the business of chemists and druggists. It will therefore be desirable to consider how far the provisions of this Act could be reasonably construed in that sense, and also to what extent such cases as we refer to would be covered by the exempting conditions defined in the Act. In the second section of the Act, enumerating the various modes in which offences may be committed, there is one in which it is stated that every person who applies to goods any false trade description shall be guilty of an offence against the Act. It is further provided in the same section that every person guilty of an offence against the Act shall be liable to imprisonment with or without hard labour, or to fine, or to both imprisonment and fine, and in such case also to forfeit every chattel or article in relation to which the offence has been committed. The only saving provision is that the person charged with such an offence shall prove that he acted without intent to defraud. Among the definitions in the second section of the Act, it is stated that the expression "trade description" is to mean any description, statement, or other indication, direct or indirect, as to the place or country in which goods are represented to have been made or produced, the mode of manufacturing them, or the material of which they consist, and it is further stated that the use of any figure, word, or mark, which according to the custom of the trade is commonly taken to be an indication of any of the above matters, is to be deemed a trade description within the meaning of the Act.

It is scarcely necessary to point out to the readers of this Journal, that in the ordinary course of business there are a number of articles with which they have to deal, which are commonly known by trade descriptions that on the face of the matter might be supposed to involve liability to the penalties above mentioned, inasmuch as they are in fact, to a considerable extent, if not entirely, false trade descriptions. To illustrate the class of articles referred to it will suffice to mention the terms Epsom salts, Seidlitz powders, Burgundy pitch, Turkey rhubarb, as being in reality false, if it be supposed that they are intended at the present day to indicate that the articles referred to are the produce of the places or countries specified. As a matter of fact, that is not the case, neither is the continued use of these terms intended to convey the idea that the articles are derived from those particular sources, but it is simply a conventional mode of designating certain articles, and nothing more. As, for instance, in the case of Epsom salts, which may be made, perhaps, at Newcastle, or in Lancashire and elsewhere, any connection between the article and the place referred to in the name that has thus been adopted by popular usage may, indeed, have long ceased to exist so far as the production of the article is concerned. There are many other instances of a similar nature that will suggest themselves in which there could not be any ground for the supposition that there was any intent to defraud. It may be taken for granted, therefore, that the use of such conventional terms will not be deemed to constitute infringements of the Merchandise Marks Act, and that so far there need be no fear of interference with the practice which has become general. There may be some other descriptions of articles in regard to the propriety of which some degree of doubt may prevail, as, for instance, the term "citrate of magnesia," which has already been the cause of much trouble and inconvenience. Although the article to which that term is applied is not citrate of magnesia, the name has become so familiar that it would be difficult to make a change, but any possible difficulty from the use of the term can easily be provided against by a proper qualification on the label, such as has long since been adopted.

In the latter portion of the third section of the Act there is, moreover, a further indication that in its administration all reasonable allowance will be made for the conventional use of names and designations of articles, for in giving a definition of the expression "false trade description," as employed in the Act, it is stated to mean a trade description which is false "in a material respect" as regards the goods to which it is applied. Therefore, since the term Epsom salts is now quite well understood to mean magnesium sulphate, and the use of the word Epsom does not in the least purport to be an indication of the place where the salt has been produced, its use would clearly fall short of stating in a material respect anything false as to the article referred to. In section 18 this view of the matter is made still more evident, since it is there specifically stated that where a trade description is lawfully and generally applied to indicate goods of a particular class, or manufactured by a particular method, the pro-

visions of the Act as to false trade descriptions shall not apply. When such a trade description includes the name of a place or country, and the goods are not actually made or produced in that place or country, the exemption provided for by the 18th section may be secured by adding immediately before or after the name of that place or country, and in an equally conspicuous manner, the name of the place or country in which the goods were actually made. Thus, for instance, it might be necessary to make use of the description, Bermondsey Morocco leather or Yorkshire Brussels carpets and Berlin wool, and though it can scarcely be held that much disadvantage would be involved in the compliance with this requirement, it may be that in certain cases it would be somewhat superfluous. Such articles as Castile soap, Venetian red, Brunswick blue, Paris green and Prussian blue, Roman alum, and many others are now so little identified with the localities in question that the prefixes have no significance of that kind.

THE DEVELOPMENT OF HEALTH RESORTS.

In the present number of the Journal will be found an abstract of one of a series of most interesting articles on Health Resorts in Austria that have appeared recently in the *Times*, and attention is especially called to this one, because it contains a suggestion that is well worthy of the attention of pharmacists in many parts of this country. In the account of Arco a description is given of the plan which is adopted there and at other places for promoting their popularity as health resorts, and making them attractive to invalids or other visitors. The business of attending to this is in the hands of an organized committee, for the constitution of which it is necessary that the place where it is to be formed should be authoritatively recognized as a health resort. In the case of Arco the committee consists of the chief municipal officer and seven other persons, who serve for three years, their duties being to carry out improvements, provide for musical performances and other entertainments, to publish advertisements, arrange for the attendance of physicians, and generally attend to everything affecting the interests of the visitors. In addition to this the Committee is empowered to collect a tax from all the visitors and other persons resident in the place in order to furnish means of defraying the cost of the work they carry out. This tax is not a heavy one, and is proportioned to the duration of a visitor's stay for any period beyond four days; each one is required to pay something less than four shillings a month, children under twelve and servants a smaller sum. Persons who can show that their means do not admit of their paying are exempted. The result is found to be highly beneficial in various ways, and it is suggested by the writer of the article that the adoption of such a system at several places in England would conduce to make their attractions as health resorts better known, and more largely taken advantage of. For instance, it is pointed out that from the Isle of Wight to Penzance there are a number of places which have a genial climate in winter, and only require a little judicious supervision and notice to become very popular among those who desire to get through the winter months amid bright sunshine and blooming flowers without leaving their native land.

This suggestion, as made by the writer of these articles, is limited; but we think it is one that might have a more extended application to several health resorts throughout the kingdom, where a little organization on the Austrian plan would have the effect of increasing the number of visitors, and materially benefiting the places. There are few who would be better qualified to take such a matter in hand than the pharmacists resident in places which possess natural attractions for invalids and other visitors. For those who find reason to lament the depression of business, or find that their trade interests are being damaged by competition, it seems that an opportunity is here offered of developing to their advantage the more professional side of their occupation, and not only of doing so with benefit to themselves, but also for the good of the places in which they are resident.

The Winter Session of the Leicester and Leicestershire Chemists' Association commences on Tuesday, and the Executive would appear to have made arrangements that should prove very advantageous to the pharmaceutical students of the district. Lectures on Materia Medica and Pharmacy will be delivered in the Society's Rooms, St. George's Chambers, Leicester, on Tuesday and Friday evenings, in addition to which the Executive has been fortunate enough to secure the use of the laboratory attached to the Coggeston Technical School, where Mr. Burford, F.C.S., will lecture on Pharmaceutical Chemistry every Wednesday until May next, the fee being quite a nominal one. We are also informed that the President of the Association, Mr. J. G. F. Richardson, has applied to the Leicester Town Council, of which he is a member, to provide for the formation of a botanical flower-bed in the Abbey Park, and that it is probable that before a year has passed this boon to botanical students will be an accomplished fact.

* * *

A meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, W.C., on Thursday next, October 27, when a discussion upon the advantages of the intended Research Laboratory will be opened with a paper entitled "The New Departure," by Mr. R. W. Giles.

* * *

The first meeting of the tenth session of the Edinburgh Chemists' Assistants and Apprentices' Association will be held on Wednesday next, the 26th inst., at the house of the Pharmaceutical Society, 36, York Place, when the President, Mr. Lunan, will deliver an inaugural address. All connected with pharmacy in Edinburgh are invited to attend.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

October 11, 1887.

The following are the questions that were set for the Preliminary examination on Tuesday, the 11th inst. :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin* :—

1. In the Roman Commonwealth were many brave citizens.
2. All persons praise diligence and honesty.
3. It is a great thing to be well taught.
4. He cannot write who has never learned.
5. Cæsar threw a bridge over the river, in-order-that his soldiers might cross on foot.

II. Translate into English, either A. (Cæsar) or B. (Virgil.)

(*Candidates must not attempt both authors.*)

A. Cæsar.

1. Die constituta causæ dictionis, Orgetorix ad judicium omnem suam familiam, ad hominum millia decem, undique *coegit*, et omnes clientes obaeratosque suos, quorum magnum numerum habebat, eodem conduxit : per eos, ne causam diceret, se *eripuit*. Quum civitas, ob eam rem incitata, armis jus suum *exsequi conaretur* multitudinemque hominum ex agris magistratus cogerent, Orgetorix mortuus est ; neque abest suspicio, ut Helvetii *arbitrantur*, quin ipse sibi mortem *consciverit*.

2. Hac oratione habita, mirum in modum conversæ sunt omnium mentes, summaque alacritas et cupiditas belli gerendi innata est ; princepsque decima legio per tribunos militum ei gratias egit, quod de se optimum judicium fecisset, seque esse ad bellum gerendum paratissimam confirmavit. Deinde reliquæ legiones cum tribunis militum et primorum ordinum centurionibus egerunt, uti Cæsari satisfacerent : se nec unquam dubitasse neque timuisse neque de summa belli suum judicium, sed imperatoris esse existimavisse.

Grammatical Questions.

(For those Candidates only who take Cæsar.)

1. Give the genitive singular and plural of *die, judicium, omnes clientes, eam rem, jus suum.* (Par. 1)
2. Write the third person singular and plural of the indicative present and subjunctive perfect of the verbs in italics. (Par. 1.)
3. Account for the mood of *fecisset* and *dubitasse*, and for the gender of *paratissimam*. What part of the verb is *gerendum* ? (Par. 2.)
4. How are questions asked in Latin ? Distinguish between *num* and *nonne*.

B. Virgil.

1. Interea magno miscéri murmure pontum,
Emissamque hiemem sensit Neptunus, et imis
Stagna refusa vadis graviter commotus ; et alto
Prospiciens, summa placidum caput extulit unda.
Disjectam Æneæ toto videt æquore classem,
Fluctibus oppressos Troas cœliqua ruina.

2. Necnon et Tyrii per limina laeta frequentes
Convenere, toris jussi discumbere pictis.
Mirantur dona Æneæ, mirantur Iülum,
Flagrantesque Dei vultus, simulataque verba,
Pallamque et pictum croceo velamen acantho,
Præcipue infelix, pesti devota futuræ,
Expleri mentem *nequit*, ardescitque tuendo
Phœnissa ; et pariter puero donisque *movetur*.
Ille, ubi complexu Æneæ colloque *pependit*,
Et magnum falsi *implevit* genitoris amorem,
Reginam petit ; haec oculis, haec pectore toto
Haeret, et interdum gremio fovet ; inscia Dido,
Insideat quantus miseræ Deus.

Grammatical Questions.

(For those Candidates only who take Virgil.)

1. Give the genitive singular and plural of *magno murmure, placidum caput, toto æquore.* (Par. 1.)
2. Write the third person singular and plural of the indicative present and subjunctive perfect of the verbs in italics. (Par. 2.)
3. Parse fully :—"inscia Dido, insideat quantus miseræ Deus." (Par. 2.)
4. How are questions asked in Latin ? Distinguish between *mum* and *nonne*.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

1. Multiply 45 tons 14 cwt. 2 qr. 5 lb. by 205.
2. Simplify $\frac{2\frac{4}{5}-1\frac{1}{2}+\ 9\frac{1}{11}}{4\frac{1}{5}-2\frac{1}{4}+13\frac{7}{11}}$.
3. Add together ·00125 of a ton, ·0125 cwt., and ·025 lb. ; and reduce the result to a decimal of 2 qr. 9 lb.
4. A man owns $\frac{3}{16}$ of a mine, and sells ·1351 of his share ; what fraction of the mine has he left ?
5. If 2 hectol. 40 lit. cost £3 6*s.* 8*d.*, what ought to be paid for 1 hectol. 60 lit. ?
6. The floor of a room 14 feet by $12\frac{1}{2}$ feet being partly covered by a carpet measuring $11\frac{1}{2}$ feet by $9\frac{2}{3}$ feet, how much floor-cloth will complete the covering, and what will it cost at 6*s.* per square yard ?
7. If $5\frac{1}{2}$ per cent. is gained by selling at £2 17*s.* 9*d.* per cwt., what will be the gain per cent. by selling at $7\frac{1}{2}$*d.* per lb. ?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

(Read carefully the following passage before answering Questions 1, 2 and 3, which refer to it.)

"At morn the black-cock trims his jetty wing,
'Tis morning prompts the linnet's blithest lay,
All nature's children feel the matin spring
Of life reviving, with reviving day ;
And while yon little bark glides down the bay,
Wafting the stranger on his way again,
Morn's genial influence roused a minstrel gray,
And sweetly o'er the lake was heard thy strain,
Mixed with the sounding harp, O white-haired Allan-bane !"

1. Parse fully the words *at, linnet's, all, while, yon, wafting, roused, was heard, thy.*
2. Write out, in a tabulated form, the Direct Objects of verbs in the quotation, the Verbs on which they depend, and the Subjects of those verbs.
3. Give a list of all the Adjectives in the passage, with their degrees of comparison.
4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where requisite :—his lordship answered that's well but i bargained for twenty and then emphatically exclaimed anchor hardy anchor to this the captain replied i suppose my lord admiral collingwood will now take upon himself the direction of affairs not while i live i hope hardy said the dying chief endeavouring in vain to raise himself in his bed no do you anchor hardy on this the captain said shall we make the signal sir yes answered he for if i live i'll anchor.
5. *Write a short composition on *one* of the following subjects :—1. Competition. 2. The importance of early mental training. 3. Westminster Abbey on June 21st, 1887. 4. The House of Commons in 1887.

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* This must be attempted by every Candidate.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The thirteenth general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, October 13, the President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—'The Smithsonian Report,' 1885. Part I.; 'The Annual Report on Alkali Works, etc,' 1886; 'Proceedings of the Naturalists' Field Club,' 1886-87; 'The Naturalists' Monthly;' *Revue Internationale*; 'Annual Report of the Alumni Association,' 1886-87; 'Annual Report of the Liverpool Engineering Society,' 1886-87; *Pharmaceutical Journal, British and Colonial Druggist, Canadian Pharmaceutical Journal, American Chemist,* and *Pharmaceutical Record of New York.*

The President now briefly addressed the meeting, and stated that during the recess an amalgamation of the Liverpool Registered Chemists' Trade Association with this Association had been affected; that new laws had been drawn up by a joint committee representing the two Associations, and that under these the Liverpool Chemists' Association would in the future perform the functions that had hitherto been performed by the two Associations, and he trusted that the amalgamated Association would be liberally supported by the members of the trade generally in the city and neighbourhood. Letters were read from Mr. B. Dickens, late President, and Mr. J. Bain, late Hon. Sec. to the Liverpool Registered Chemists' Trade Association, officially announcing the dissolution of this Association as a separate organization, and wishing success to the Liverpool Chemists' Association.

Messrs. B. Dickens, R. W. Kirkus, J. R. Day, J. Hocken, J. Bain, J. M. Frank, J. E. Adams, J. J. Smith, H. Jones, J. Oliver, H. Smith, and Dr. R. J. Elliot, were unanimously elected members.

The President now called upon Mr. Conroy to read his paper on "The B.P.C. formula."

The President thought it right to say that as a member of the British Pharmaceutical Conference Formulary Committee he was placed in a somewhat delicate position with regard to the paper about to be read. Had not this meeting been a somewhat special one he would have thought it better that someone else should occupy the chair, but under the circumstances that course would hardly have been right, and might have been misconstrued.

Notes on the British Pharmaceutical Conference Unofficial Formulary.

BY M. CONROY, F.C.S.

The Formulary presented last month to the members of the British Pharmaceutical Conference is the outcome of the work done by the Committee appointed by them at their previous annual meeting. The appointment of this Committee met with much cordial approval, since it supplied a long-felt want for some standard of uniformity in the many preparations of new remedies which are continually coming to the front. Medical men are anxious to try these as early as possible, and cannot wait until they are officially recognized by the Pharmacopœia authorities in their decennial revisions. The idea is scarcely novel, as a similar step was taken by the Société de Pharmacie of Paris some ten years ago, and the American Pharmaceutical Association has also issued such a work. That a corresponding step should be taken by English pharmacists is only reasonable, and it would be difficult to find a more fitting body for the work than the British Pharmaceutical Conference. We have only to look through the Conference 'Year Books' for the past twenty years or more to convince ourselves of this fact, and we further find that the members of the Formulary Committee are men who have always taken a most active and able part in pharmaceutical matters, and who have supplied to medicine some of our best formulæ.

The compilation of an Unofficial Formulary is a big subject, but in undertaking their duty, the Committee seem to have wisely marked out for themselves certain well defined lines for their guidance, within which they have kept. On the one hand we find no poaching on preserved ground, and on the other no great straining after novelties. Their work is a careful collection of some 37 new formulæ of unofficial preparations in frequent or occasional use, such as will be found most useful to the dispenser as well as to the prescriber. The scope of the present edition is rather limited, but now that a start has been made let us hope that the work will yearly increase. I have on the table samples of each of the preparations contained in the Formulary, prepared strictly to its directions. Upon each of these I shall make a short comment in the hope of creating a discussion and hearing the opinion of others.

Chloral cum Camphorâ.—Is a mixture consisting of equal parts of each of the ingredients made by rubbing them in a warm mortar until liquefied. It is identical with the pigmentum chloral et camphoræ of the Throat Hospital, and is used as an application to painful parts in neuralgia and rheumatism. The formula works well.

Elixir Cascara Sagrada.—This formula makes a very nice preparation, the unpleasant and intense bitterness of the *Cascara Sagrada* being in a great measure covered by the adjuncts. It deposits, and should be filtered a few hours after mixing.

Elixir Guaranæ.—This produces a nice palatable preparation, and I find the addition of sand quite unnecessary, as the percolation proceeds sufficiently rapidly without it. The omission of the magnesia would also, in my opinion, be an advantage. The guaranine would then exist in the preparation combined with its natural acid, instead of being set free. Evaporation of the expressed liquor is fortunately unnecessary.

Elixir Simplex.—Is a very agreeable mixture. It is easily made, keeps clear, and will probably become a popular flavouring for medicines.

Emulsio Olei Morrhuæ.—I have worked hard at this, but have not succeeded in making an emulsion by strictly following the directions of the formula. I have tried it more than once, and have got others whom I consider experts to try it, but with no better success. With the addition of 1 ounce of pulv. acacia and the use of a mortar and pestle I have produced a very perfect emulsion, miscible with water in all proportions. The taste of the cod liver oil is well covered by the oil of cassia, whilst the tincture benzoin. simp. and sp. chloroformi will retard rancidity.

Extractum Grindeliæ Liquidum.—Prepared from the dried whole plant of *Grindelia squarrosa* and *G. robusta.* These plants have obtained a great reputation in the treatment of asthma, bronchitis, and whooping cough. The formula works well, and yields a very perfect fluid extract. The menstruum is rectified spirit, and is more alcoholic than the fluid extract of the United States Pharmacopœia, which consists of three parts alcohol (94 per cent.) and one part of water.

Extractum Hamamelidis Liquidum.—Prepared from the *leaves* of *Hamamelis Virginica.* The bark is very much used for the same purpose. Both it and the leaves are imported from the United States. They possess powerful astringent properties, and are used for checking hæmorrhages and excessive mucous discharges. The formula yields an excellent fluid extract.

Extractum Hydrastis Liquidum.—Prepared from the rhizome, which possesses tonic stomachic properties. The formula works well and yields a very fine fluid extract. There is a similar preparation in the United States Pharmacopœia, but the menstruum there ordered is more alcoholic, and I think unnecessarily so.

Injectio Curare Hypodermica.—There are two formulæ given for this, both of which work well. As it contains no preservative, it will be necessary to make it as required. Used as a palliative in hydrophobia.

Linimentum Opii Ammoniatum.—Makes a very good useful liniment. The directions for making are simply "mix and filter." The liniment would keep bright if the mixture were allowed to stand an hour or two before filtering.

Liquor Ferri Hypophosphitis Compositus.—A compound liquor of the hypophosphites of iron, lime, sodium and magnesium. The formula is a good one, and works well, but, like all aqueous solutions containing hypophosphite of iron, it throws down a deposit.

Liquor Picis Carbonis.—Made by digesting 4 ozs. of prepared coal tar in 1 pint of tincture of quillaia at a temperature of 120° F. The liquor makes a nice and permanent emulsion when added to water.

Pilula Ferri (Blaud).—This is an excellent formula. It works well and easily, and produces a pill containing the maximum of ferrous salt.

Pix Carbonis Liquida Præparata.—This is simply commercial coal tar kept at a temperature of 120° F. in a shallow vessel for one hour and frequently stirred. Introduced evidently for making the liquor picis carbonis.

Syrupus Apomorphinæ Hydrochloratis.—This makes a nice syrup with good keeping properties. It is now much used as an expectorant.

Syrupus Butyl-Chloral.—Has been in frequent demand for some time past. The formula yields a very nice syrup. It is identical with the one in Martindale's 'Extra Pharmacopœia.' A useful remedy in facial neuralgia.

Syrupus Calcii, Manganesii et Potasii Hypophosphitum.—I am not aware of any demand for this syrup, and I am at a loss to know why boiling water and a hot mortar are ordered. The lime salt is the most insoluble one in the formula, but it is almost as soluble in cold as in boiling water, and it cannot be dissolved in the quantity of water ordered.

Syrupus Cascara Sagrada.—Fluid extract of liquorice and carminative tincture are used very successfully as adjuncts to disguise the bitterness of the cascara. It is an excellent formula.

Syrupus Ferri Hypophosphitis.—This has always been a troublesome syrup, and I consider this formula as good as can be devised.

Syrupus Ferri Phosphatis Compositus.—With the exception that precipitated carbonate of calcium is used instead of slaked lime, this formula is identical with that contained in Martindale's 'Extra Pharmacopœia.' This syrup cannot be made to hold in solution the large amount of iron and lime salts given in the formula published in Parrish's 'Pharmacy,' and consequently it has always been a source of trouble and annoyance. This formula makes a very nice syrup, that, so far, has kept very well. Each fluid drachm contains about $\frac{1}{2}$ a grain of iron phosphate and $\frac{4}{5}$ of a grain lime phosphate, with small quantities of the phosphates of potassium and sodium. It contains no orange flower water.

Syrupus Ferri Quininæ et Strychninæ Phosphatum.—Another old favourite. The formula works well, and is simplicity itself. Each fluid drachm contains 1 grain ferri phosph., $\frac{3}{4}$ grain quininæ phosph., and $\frac{1}{32}$ grain strychninæ phosph.

Syrupus Hypophosphitum Compositus.—For a few years past there has been a demand for a syrup of this nature, so that this formula will be welcome to many. It works very well and produces a nice syrup, which, however, is weaker in both quinine and strychnine than the syrups usually made and sold under this name.

Tinctura Benzoini Simplex.—This scarcely calls for comment. It is used in the preparation of emulsio olei morrhuæ of this formulary, and no doubt it will be found useful for many other purposes.

Tinctura Bryoniæ.—This formula is identical with the one contained in Martindale's 'Extra Pharmacopœia.' There has been a little demand for a tincture of bryony, but so far as my knowledge goes, the tincture hitherto used has been made from the dried root. I cannot find in any works that I have consulted on the point that a tincture from the fresh root is any more efficacious, but if it be so, we should not grudge the extra trouble entailed. There is, however, to be considered the disadvantage of not being able to obtain the fresh root all the year round. Tincture of bryony is useful in pleurisy.

Tinctura Carminativa.—A most useful flavouring agent for elixirs and many other purposes.

Tinctura Convallariæ.—The flowers and stalks only are used in preparing this, but the tincture hitherto made has, as a rule, been prepared with the whole plant, including the root.

Tinctura Coto.—There has been a slight demand for this tincture for some time back. Used in gout and rheumatism; also in diarrhœa. The formula makes a good tincture.

Tinctura Ergotæ Ammoniata.—Ergot, in combination with ammonia, is said to be more active than in any other form, so that a demand has arisen for an ammoniated liquor containing one ounce of ergot in one fluid ounce. This will probably now give place to the new formula, which makes a very nice tincture, containing one part of ergot in two parts. The percolation is, however, exceedingly slow, and I would suggest that the ergot be in much coarser powder. The process is an extravagant one, inasmuch as the marc is not ordered to be pressed. It retains about ten fluid ounces of the menstruum.

Tinctura Erythrophlæi.—Makes a good tincture. It is said to be more powerful than digitalis, and is used in mitral disease and cardiac dropsy depending on it. It is better known as tincture of casca.

Tinctura Eucalypti.—This produces a good tincture. It is prepared with rectified spirit, instead of proof spirit, as now commonly used.

Tinctura Euphorbiæ.—The decoction and fluid extract of *Euphorbia pilulifera* have for some two years past been in request as remedies in asthma and bronchial affections, but there has not been any great demand for the tincture.

Tinctura Hamamelidis.—A similar formula to this is contained in Martindale's 'Extra Pharmacopœia.' There is a large and increasing demand for both the tincture and fluid extract. It should be observed that the tincture is made from the bark, while the fluid extract is made from the leaves. *Hamamelis Virginica* is a most valuable hæmostatic, serviceable in all passive hæmorrhage.

Tinctura Hydrastis.—This, like the fluid extract of this formulary, is made from the rhizome of *Hydrastis canadensis.* The tincture is made with proof spirit, and the fluid extract with a mixture of equal parts of rectified spirits and water. It scarcely seems necessary to have the two preparations differing practically only in point of strength.

Tinctura Iodi Decolorata.—This makes a very nice colourless tincture, but I find that it does not become completely decolorized until after it is diluted with the rectified spirit and kept for a short time.

Tinctura Pruni Virginianæ.—This formula produces a very fine full-flavoured tincture. It is coming very much into use for the relief of cough in phthisis and bronchitis.

Tinctura Quillaiæ.—Made by exhausting quillaia bark with rectified spirit. This tincture possesses considerable emulsifying power, hence its use in the preparation of liq. picis carbonis. It will be found very useful in mouth and hair washes.

Tinctura Strophanthi.—This is made of the strength suggested by Mr. Martindale, one of seeds in twenty of tincture. The original formula suggested by Dr. Fraser did not exhaust the seeds.

The paper, which was accompanied with specimens of the new preparations, was well received, and elicited a good discussion, in which the President, Messrs. B. Dickens, Dutton, J. J. Smith, J. T. Hornblower, and J. S. Ward took part, and a vote of thanks proposed by Mr. Hornblower, seconded by Mr. Dutton, and supported by Mr. Ward, was heartily accorded to Mr. Conroy, who replied to the discussion, and thanked the meeting for the manner in which his paper had been received.

The meeting now terminated, the President announcing that at the next meeting Mr. E. Davies, F.C.S., F.I.C., will read a paper.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual general meeting of the Midland Counties Chemists' Association was held in the Grand Hotel, Colmore Row, Birmingham, on Friday, October 14, at 3 p.m. There was a good attendance.

The annual report presented by the Council to the members commenced with a reference to the Presidential Address delivered at the commencement of the previous session by Mr. T. Barclay, on "Pharmacy in the Provinces, with especial reference to Education," and stated that copies of this address might still be had on application to the Hon. Secretaries. The evening meetings had been well attended, much better than in former years, but still, in a town and district like Birmingham, the Council thought they ought to be better supported, and asked members who were unable to be present themselves to give their assistants and apprentices the opportunity of attending. The following papers had been read, "Sir John Lubbock's Shop Hours' Regulation Bill," by Mr. Martin Magor; "Sugar Growing and Refining," by Mr. E. T. Brewis; "The Composition of the Ash of Ipecacuanha Root," by Mr. H. E. Munns; "Linimentum Terebinthinæ," by Mr. Geo. E. Perry; and "Tincture of Quinine and its Assay," by Mr. F. H. Alcock, F.C.S. The classes which were to have commenced on Monday, October 4, 1886, did not begin until the following January, owing to the small number of students who presented themselves. Regret was expressed that the exertions of the Council for the benefit of its younger members had not been more appreciated, and attention was called to a circular giving particulars of the classes for the fourth session. Owing to the Chemists and Druggists' Trade Association having ceased to exist, the library had been temporarily removed to 9, Broad Street Corner, where on application books might be obtained between the hours of 10 and 12, and 2 and 4 daily. The thanks of the Council were tendered to the Pharmaceutical Society for the *Pharmaceutical Journal*, to the British Pharmaceutical Conference for the 'Year-Book,' to the proprietors of the *British and Colonial Druggist* for that journal, and to Messrs. Burroughs, Wellcome and Co. for 'Remington's Pharmacy.' The sixteenth annual ball, held in the Town Hall on Thursday, January 20, had been a marked success. There were not so many present as on former occasions, owing to several other important public balls being held on the same night, nevertheless it was one of the most enjoyable ever held by the Association. A sum of £3 18*s.* had been expended by the Hon. Treasurer for the relief of distressed chemists. The Council had received an intimation from Mr. Lucas that he would be unable to continue in this important office any longer, and took the opportunity of acknowledging the very many services to the Association by that gentleman. The balance in hand was not so large as that of the previous year, owing to additional expenses in connection with the classes and evening meetings, and no surplus arising from the ball. It was hoped that there would be an accession of new members to maintain the activity and usefulness of the Association.

The Balance Sheet was presented, and showed that the year had commenced with a balance in hand of £58 17*s.* 7½*d.*, and that the receipts had amounted to £40 14*s.* 11*d.*, including 92 members' subscriptions at 2*s.* 6*d.*, and 10 associates' subscriptions at 1*s.* 6*d.*, and £25 18*s.* for class fees, the total being £99 12*s.* 6½*d.* On the other side the expenditure had amounted to £68 6*s.* 8½*d.*, the balance in hand being £31 5*s.* 10*d.*

The report of the Council was received and adopted.

The following appointments were then made for the ensuing year:—*President*, Mr. G. E. Perry; *Vice-Presidents*, Messrs. W. F. Wyley, F.C.S., and A. Southall, F.C.S.; *Treasurer*, Mr. C. J. Arblaster; *Auditors*, Messrs. F. Barlow and H. Howes; *Hon. Librarian*, Mr. F. H. Alcock, F.C.S.; *Hon. Secretaries*, Messrs. C. Thompson, and F. H. Alcock, F.C.S.

For other members of Council a ballot took place. Twelve were elected by this means, exclusive of eight to be appointed to represent neighbouring towns.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first general meeting of the eleventh session of the above Association was held at 103, Great Russell Street, October 13, Mr. T. S. Dymond, President, in the chair.

The minutes of the annual general meeting having been read and confirmed, and several new members proposed, Mr. Dymond delivered—

The Inaugural Address.

Gentlemen,—I thank you for the honour you have done me in electing me as your President for the ensuing year. I shall endeavour to prove myself worthy of the confidence that you have reposed in me by every means in my power. But it is only with your help that I can hope to guide the affairs of this Association with success. If you will support the meetings by your attendance, by joining in the discussions, and by providing papers, if you will loyally support the Executive in the difficulties there are sure to be, if you will persuade your friends to share with you the advantages of this Association by becoming members, if each will do his part for the welfare of the whole, then a brilliant success is in store; we shall have a great reward, and it will be you, not I, who will deserve the praise.

This is the eleventh year of the existence of this Association. The *raison d'être* of its existence is the same as it was at its commencement, viz., the profit of the Chemists' Assistants of London. I ask in what way do we profit? and I will reply at some length, in order to show you that when I ask for your support to make this session a success, the advantage of yourselves is the ultimate end I have in view.

The first way in which we profit is by association. Living alone, without interest in each other's welfare, we become selfish and absorbed in our own lives; but bound together by membership of one body, our own petty cares are forgotten in a desire for the common weal, for except the whole body prospers the members cannot. Is it not this *esprit de corps* which is so wanting in the chemists' profession? In the medical and legal professions, in the army and navy, in the drama and the arts, amongst mechanics and labourers, and even in the most degraded classes of humanity, this sentiment is strongly developed; but chemists allow the Association which had been formed for the protection of their trade interests to expire. Probably it is partly because when the chemists of to-day were assistants there were no associations such as this to teach them the value of association, and when the present generation of assistants becomes employers there may be no lack of support to trade confederations. This is a view which I wish especially to press on employers in urging them to support our Association. Again, union is strength, and though this power may never be

used, when, as with us, the interests of employer and employed are identical, still the sense of power and responsibility is invaluable to the mental development.

Besides this inter-association we are brought into contact with men outside our body, and we come to know and esteem those whom we had before remembered with dislike from an all too brief interview in the examination room, or those who, far away in the pharmaceutical Olympus, we regard with suspicion because we do not know them. How can we expect to gain that mental development we all require if we do not sit at the feet of Gamaliel, and learn to love and respect those whose lives are more advanced, whose experience is greater, and whose minds are more developed than our own.

Again, we profit by the education we obtain at our meetings. We listen to papers, some of them summaries of what it is useful to know, and some dealing with new and original work, which those of us who have not much time for reading, would perhaps not hear of if they were not read to us. But the best and most thorough education is obtained by writing papers. It is not always easy to remember what is heard or read, but what is written or spoken is never forgotten. The extensive research and reading that is necessary, the thought required, and the practice in expressing one's thoughts in writing clearly and concisely, the distinction that one obtains by the publication of the paper, are of the greatest value to us, and small beginnings lead to greater things; researches in a small way lead to researches in a large way; papers at the meetings of this Association lead to papers at the meetings of societies that hold a more important position in the world; we have begun to climb the path that leads to the pinnacle of fame.

Another way in which we profit is by learning to speak. By discussing the papers or taking part in the debates, that diffidence which all at first feel is gradually overcome, and first rapidity of thought, then fluency of speech is obtained. I think there are many members of this Association who do not sufficiently realize the importance of this art. I do not think that good speakers are at all necessarily the most useful men. Indeed, it is an axiom that the greatest talkers are the poorest workers, and the truth of this is constantly seen in the House of Commons; but if we wish to improve our positions and to become public men, the most important qualification necessary is the ability to speak.

And last, but not least of the means of profit that this Association affords, is the pleasure. Tired and jaded with the business of the day, it is a relief and pleasure to forget one's work in the society of one's friends, and either to obtain relaxation in the realms of politics and science, in clouds of tobacco smoke and music, in the mazy dance, or in a good dinner. I hope that before very long, our rooms may be open for social purposes every night, so that there may be some place into which we may always turn to meet our friends after business hours.

There is one form of relaxation which this Association is unable to offer its members, viz., sports and pastimes. Like the members of almost all other retail trades, chemists' assistants are denied what is considered essential to the well-being of every other class of English workers. I am aware that, owing to the exigencies of retail trade, it is impossible for those who are employed in country or suburban pharmacies ever to be off duty on Saturday afternoon, but I know that in town pharmacies this privilege is frequently not given where at intervals it might be without disadvantage to the employer. In one retail house with which I have been connected, out of six assistants one had a half holiday on Saturday afternoon. In another, the whole staff of six assistants had to remain on duty till the usual hour, though probably there would not be half-a-dozen customers after three o'clock. I need not say how much pleasure and satisfaction was given in the former case, and how much dissatisfaction and grumbling was caused in the latter. Not only would our strength and ability be increased by occasional indulgence in violent exercise while we are assistants, but when we become employers, we should be better able to stand the care and responsibility of our position. I am too much of a Sabbatarian to advocate strongly the practice of sports and pastimes on Sunday, but I must say that if it is justifiable in the case of anyone it is for us.

In writing of these means of profit, I have a somewhat high ideal to which they are to help us. I believe that the amelioration of mankind should be our great object in life, and that in order to carry out this object, we should seek to benefit, firstly, ourselves (not selfishly, to the disadvantage of others); secondly, those with whom we are immediately connected (again not selfishly to the disadvantage of others), and finally, the world at large, and that the three objects should be carried out simultaneously. Now, by making acquaintance with those about us and those above us, by obtaining that knowledge by which alone we can hope to prevent pain and hardship, by obtaining health, wealth, and position, whereby our means of influence for good are very greatly increased, all of which this Association helps to give us, are we not doing our best for the amelioration of mankind? If there is one thing to beware of, it is that indolence which goes by the name of content. There are some men who, unknown while they live, and unregretted when they die, pass on through existence in a slow monotony, and are *content* never to become wise, never to become rich, never to make any mark in the world so long as they can do their *duty*. But is it their duty to leave the world exactly as they found it?—to leave no cheering footprint on the sands of time?—and will they be content when at last they find that they have absolutely no cause for self-satisfaction? No, indeed! Let us never rest till we are perfectly wise and perfectly happy; let us be fired with more ambition, that we should be more wise and happy ourselves, and more able to make others wise and happy, never content till at the last we find that we have done our duty, for the world is better for our lives.

So I ask you that for these ends you will partake of the advantages that this Association affords, by a frequent attendance at its meetings, by endeavouring to increase its numbers, by conducting research either literary or experimental and reading papers thereon before it, by entering into its discussions and debates, and by partaking freely of the pleasures it affords.

There is one point in connection with the programme for the forthcoming first half of the session to which I particularly wish to draw your attention. We have been fortunate in obtaining the services of some eminent pharmacists, but we have not been so fortunate as regards papers by our own members. This is probably because the members wish to reserve their research-work for competition for the Burroughs Wellcome prize. Your Council have thought that there may be many members who have made interesting observations which in themselves are of not sufficient importance to form the subject of an evening's paper, but which are well worth bringing forward as a note. An evening has therefore been set apart on which dispensing memoranda and pharmaceutical, chemical and botanical notes may be read, notice of these being sent to the Secretaries ten days before the date of the meeting. This plan has been adopted by an association only a few months younger than our own at Edinburgh, and in the *Pharmaceutical Journals* of January 29 and March 12 of this year, pages 619 and 757 respectively, you can see that considerable success has attended its efforts. For the honour of the older Association I hope that you will take care that our venture is, at any rate, not less successful.

The Burroughs Wellcome Prize is again offered for competition this year. The Council wish to make the field of competition as wide as possible. The subject is pharmacy, but it may deal with the extraction of an

alkaloid or with the preparation of extracts or tinctures or with dispensing. The essay may be a summary of previously known facts, or better, it may recount the results of original work, or best, it may be the two judiciously blended. But whatever it be, it must be thorough and good, for unless it be so, so valuable a prize cannot be awarded. I may remind you that the prize was not awarded last year, to show you that an essay that is worth the prize has a very good chance of getting it. If a competitor is unsuccessful the first time, he can reserve his essay, and improve it for the next.

An important change that has been made this session is the change of day of meeting from Wednesday to Thursday. It has long been felt that it would be desirable to have our meetings regularly on the same night throughout the session. I have known men who, unaware of the occasional change, have come from distant parts of London on Wednesday evening, only to find that there was no meeting. It was impossible always to hold our meetings on Wednesday, owing to the Evening Meetings of the Pharmaceutical Society and other events being held on that night. Thursday has not this objection, for the only other pharmaceutical event on that evening, the meeting of the School of Pharmacy Students' Association, takes place much earlier. Indeed, it is an additional reason for the change of night that members of that Association, whom we shall always welcome here, can come to our meetings after their own are over. This change was not made without much deliberation and careful inquiry. Your Council found that though some members would be unable to come on the new night, as many or more would find it more convenient than Wednesday; for Wednesday is especially the off-night for managers and employers. Your Council hope that you will make every effort to make it convenient to attend on the Thursday, so that the attendance at the meetings may not suffer by the change.

There is a good omen for the success of the session inaugurated to-night in the early publication of the 'Proceedings,' and you will, I am sure, appreciate the efforts of those gentlemen who have worked through the summer months in order that copies might be ready for distribution at the beginning of the session. There was a hope expressed at the end of last session that the Council would be able to issue the 'Proceedings' without charge to members, and I am very glad to tell you that this hope has been carried into effect. All members of last session will be entitled to a copy, and can have it on application. All members of this session will be entitled to the 'Proceedings' of this session, which will be issued next summer. The cost this new departure entails is considerable, and the Council trust that their efforts to give every advantage to the members of the Association will be met by increased support, and that not only will each new member possess himself of a copy, to which he will be entitled for half the published price, but that many of the old members will take extra copies, to which they will be entitled for the same sum, for distribution among their friends; for there is nothing that speaks so highly to the success of this Association as the 'Proceedings.'

Gentlemen, this is not a jubilee address. It is true that the Queen of whom we are so proud has completed the fiftieth year of her reign, but I cannot speak of the gradual progress of this Association during that period, for it is not yet fifty years old, and the records of the Association that previously existed for a few years, are very meagre, except that we learn it met in a tavern, and the members imbibed beer and inhaled tobacco smoke to assist them in the digestion of scientific disquisitions.

Nor shall I attempt to sketch fifty years progress in pharmacy or in chemical science, for the former has been done by our kind friend Mr. Atkins in his address to the British Pharmaceutical Conference, and the latter by Roscoe in his to the British Association. No! the hope of our Association lies in the present and in the future, not in the past, and I look forward to the time when we may be celebrating the jubilee of this Association in 1927. I have not that prescience of coming events to pretend to know in what state it will be then, or even if it still exist, but I do know that its influence will be still alive, and like the ripple in the water when a stone has fallen, that influence will expand and widen over the surface and through the depths of life, though lost to sense, yet infinite, eternal.

If, then, the future like the past, is unknown, we must deal with the present, and discuss those questions of to-day which affect ourselves as responsible members of the pharmaceutical body. Among such questions is that of the Sheffield Drug Prosecutions. These you will recollect arose out of two alleged infringements of the Food and Drugs Act. In one case paregoric was supplied by a grocer containing no opium, and in the other, tincture of opium was supplied by a chemist containing an insufficiency of opium. The Sheffield stipendiary magistrate refused to convict on the grounds that the articles were of the "nature, quality and substance demanded," for as the drugs were not supplied in a prescription by the order of a medical man, the Pharmacopœia standard was not essential. Your late Vice-President, Mr. Burnett, first drew attention to this decision by a letter to the *Pharmaceutical Journal*; a brisk discussion followed, in which the majority of Sheffield pharmacists sought to show that a blow was being struck at their very existence, and their one hope was being taken away, while the Journal in its leaders pointed out, that it is in obtaining the confidence of the public in which chemists must put their faith, not in legislation. However, on an appeal to the High Court of Justice on the tincture of opium case, the Lord Chief Justice reversed the decision of the magistrate, there being no defence on his behalf. Whether this decision is good law or not, it is certainly what should be the law, and of course it is a very useful one, for it compels chemists to keep up the character of the drugs they sell, and to have the knowledge necessary to be able to guarantee this character. It in fact establishes by law what the *Pharmaceutical Journal* previously pointed out to be the only policy on which the chemist can rely in the future, viz., that of obtaining the confidence of the public. To prepare chemists for this new *régime* the Council of the Pharmaceutical Society are promoting the Pharmacy Acts Amendment Bill in Parliament, and in consequence of this recent decision it becomes more than ever imperative that the Bill should soon become law.

The Pharmacy Acts Amendment Bill is another of those questions of the day with which I should deal, but we discussed the matter so thoroughly last session, and the decision we arrived at was so promptly followed by action on the part of the Council of the Pharmaceutical Society, that I need not reopen the question now. But I cannot help speaking with admiration of the indomitable energy of one man, who night after night sacrificed his leisure in the House of Commons, and by his unceasing perseverance first gained the approval of the Government to the measure he had at heart, and then overcame the opposition of those who had wished to oppose it one by one. A man who will do so much and so unselfishly is worthy of our esteem and of our support, and I am sure that I may tell him that the vote that was almost unanimously passed last session will not be reversed, but that he may still count on the support of the Chemists' Assistants' Association.

I should hesitate to speak of the Shop Hours' Regulation Bill did I not feel that we who are *employés* now will be employers before long, and hence our own interests are identical with those of our masters; we therefore discuss these questions as pharmacists, not as assistants. You will remember that contrary to the wishes of presumably the majority of chemists, the Council of the Pharmaceutical Society decided to oppose the measure, should it be introduced into Parliament, as far as it

applies to chemists, with a view to obtaining their exemption from its action.

Passing over, for the present, the merits or demerits of the Bill, I venture to think that the grounds on which the Council base this opposition are untenable. As stated at the Annual General Meeting they are:—that the calling of pharmacy, being a profession, it should not be legislated for as if it were a trade, and that as the chemist or his assistant is obliged to attend at his pharmacy, whether his shop is open or not, he should be allowed to keep it open as a means of recuperation. It appears to me that with regard to the first part of this statement, the calling of pharmacy is partly a profession and partly a trade. In so far as it is a profession, it should be amenable to the usages of the profession, which necessitate the attendance of a dispenser at the pharmacy; but as far as it is a trade, it should be amenable to the usages of a trade. With regard to the second part of the statement, it might as well be said that an inn should be kept open for every idle tippler, because it is obliged to provide refreshment to the *bonâ-fide* traveller. Do the Council wish that open shop should be kept on Sunday? The argument would apply equally well. It is not as if both the chemist and his assistants had to remain in the pharmacy. I suppose that on an average there is not a sixth part of the work done after the shop is closed that there is before. I believe that this action may be damaging to the Pharmaceutical Society, for the appearance of selfish ends, which we wish always to avoid, is here manifest.

With regard to the Bill itself, an objection that is frequently made is that it partakes of that socialistic tendency which, interfering with individual liberty, must be applied with the greatest caution. From the earlier part of this address you will have gathered that I am no socialist. I believe that competition, instead of being the root of misery is the source of individual and national prosperity. Legislation should not be employed to prevent competition, but to protect the interests of the many from the rapacity of a few. It is this that Sir John Lubbock's Bill attempts to do. Trades unionism of shopkeepers (which would have been far better than legislation) having failed—for though the majority will agree to early closing there is sure to be one rapacious individual, who, by trading at late hours, necessitates the others doing so also—recourse must be had to legislation. Another objection that has been taken to the Bill is that tobacconists, who are allowed to keep open late, will be able to keep drugs after chemists' shops have closed, and druggists will only have to take out a tobacconist's licence to keep open shop after closing hours. For that matter tobacconists might sell meat and clothes and vegetables, and anything else, and any other trade might take out a licence for tobacco. Besides, it would not be much good, for neither the tobacconist who kept his drugs, or the druggist who kept his tobacco, could sell anything but tobacco. Another objection raised to the Bill is on the ground that in poor districts, and in places where much trading is done late at night, a great loss would be sustained by the shopkeepers. But this is met by the system of local option which is incorporated in the Bill, whereby two-thirds of the shopkeepers of the district can veto the application of the measure to that district. I am aware that a small minority will then suffer, but it is that the great majority who now suffer may gain. It may decrease to a small extent the freedom of the exchange of money, but the national gain in health and strength of mind and body will far more than counterbalance any loss in this respect. For by increased bodily and mental activity we gain as a nation over our great competitors; by *de*creased freedom of exchange, the pecuniary relation of class and class may be slightly altered, but the prosperity of the nation is not affected.

An instance that has been cited as evidence against the Bill, is that a young man who strongly supported its principle while he was chemist's assistant, when he went into business kept his shop open till 12 o'clock. But is not this the strongest possible argument in favour of the Bill, that chemists who hold this principle, and wish to close early, find themselves compelled to keep their shops open till so late an hour?

I therefore hope that the Council of the Pharmaceutical Society will not persist in desiring that chemists should be exempted from the action of the Bill, both because they cannot consistently do so on the grounds they put forward, and because the principle of the Bill has been approved by the majority of chemists.

The intended establishment of the Laboratory for Pharmaceutical Research is a matter of importance equal to any of the questions I have been considering. While the question of education and the Pharmacy Acts Amendment Bill ultimately affects the relations between the pharmacist and the public with a view to obtaining its confidence, the research laboratory will do so between the pharmacist and the medical man with a view to obtaining *his* confidence. The one chiefly affects our pockets, the other chiefly affects our status; which is the sweeter? On October 27, that well-known pharmacist, Mr. R. W. Giles, has consented to open a discussion with a paper on this subject, and I ask you to come and listen to words, which, spoken in these rooms, will echo to the farthest limits of the pharmaceutical world.

I have thus touched briefly on several of the questions which affect ourselves to-day, and though they are of a contentious character, I have tried to treat them in an unbiassed and liberal manner. I desire that we should always treat these questions in this spirit, and view them from a large and liberal standpoint, giving credit to the other side for honesty of purpose, never becoming slaves or tools of either party, and, while difficult to convince, open to conviction. Do not indulge in that blind opposition for the sake of opposition which is so frequently indulged in by a section of the pharmaceutical press, and which is born of ignorance, and do not mistake it for duty. Remember that to the Pharmaceutical Society the charge of pharmacy is given, and that to prosecute this charge successfully they want the help of all pharmacists. Then support the Executive of the Pharmaceutical Society where you can, and, if you cannot, state your case plainly and without rancour. Such honest opposition will do far more for your case that if it were violent and abusive, and can only be productive of good to the Society.

Above all things take interest in these questions, and think them out for yourselves. Consider the knowledge of pharmaceutical politics as much a part of your education as the knowledge of pharmaceutical science. Remember that knowledge is not gained for its own sake; that were useless; but because from knowledge, illumined by experience, we gain wisdom; wisdom which alone can bring us happiness, wisdom which alone can crown with success our efforts for the amelioration of mankind.

At the conclusion of the address—

Mr. M. Carteighe, President of the Pharmaceutical Society, said it was a very great pleasure to him that upon this, his first visit to the Association, Mr. Dymond should occupy the presidential chair. It had been his good fortune to know most of the former Presidents, but Mr. Dymond's pharmaceutical career he had followed from its commencement. Remarking upon the depression in the craft he was pleased to see it in no way affected the Association. This depression was not due to any loss of confidence in chemists by the public, but much of the present respect entertained for pharmacists by the general public was due in a large measure to the eminent standing and good sense of the early promoters of the Pharmaceutical Society. He felt that he must compliment the Association upon the high position that it held, and regarded with pleasure the interest in its proceedings which many employers evinced who formerly

looked on with something like suspicion. This was no doubt due to the high character of their papers and discussion, so much so that it made it somewhat serious to provide adequately for a Society not very far away. He reminded the members of the difficulty of ascertaining what the effect of an address like the one just heard would have upon some, and asked them to be gentle and deal kindly with matters which were tender subjects to some veterans in pharmacy. He feared there were few who could obtain the recreation asked for by the President, but thought the relation of a pharmacist to his qualified assistant should be, and he believed generally was, exactly similar to that subsisting between a surgeon's assistant and his employer, both holding exactly the same qualification. Good assistants would certainly always treat their superiors in age with courtesy and respect. In coming there that evening, he had not anticipated any direct reference to the Pharmaceutical Society and its policy, but did not intend to offer any criticism, preferring to let the address stand upon its own merits. He was confident, however, that if the Association still adhered to the wise policy it had hitherto pursued, the future would be even more successful than its past. In conclusion he begged to propose a hearty and cordial vote of thanks to Mr. Dymond for his thoughtful and intellectual address.

Mr. Joseph Ince had very much pleasure in seconding the vote of thanks. He had often heard much of the Association in the past, but under the admirable guidance of their President he felt sure he should hear much more of it in the future. Upon the chief subjects of the address he admitted his inability to criticise, as he did not personally combine politics with scientific knowledge in the manner Mr. Dymond seemed to expect. He thought the Association was most useful in encouraging members who write papers to learn early the art of composition. The difficulty of writing a paper well was almost equal to the difficulty of getting people to read it. The art of speaking also should be no more trouble to the speaker than it was to the audience to listen. He further pointed out the value of an association such as this in obtaining for its members an intellectual power that could not be acquired by hard reading. He could not help thinking that the most admirable thing about the Association was not from its having been, but from its continuance, which was of such a character as to be worthy of great praise. He congratulated the Association on the address which they had just heard, and begged most heartily to second the motion.

The motion having been put by Mr. Carteighe, and carried with acclamation,

Mr. Dymond in reply thanked Mr. Carteighe and Mr. Ince for the kind manner in which they had proposed and seconded the vote of thanks, and also the members for the way they had received it. It had afforded him very great pleasure in looking up matter for the address, and had caused him to give more attention to some subjects than otherwise he would have done, thus instancing the value of writing papers. He cordially welcomed old members back again, and expressed great pleasure at seeing many new faces amongst them that evening.

The proceedings then terminated.

The British Association for the Advancement of Science.

ADDRESS TO THE CHEMICAL SECTION.

BY EDWARD SCHUNCK, PH.D., F.R.S., F.C.S.

(*Continued from p.* 295.)

I will not on the present occasion dwell on the vast addition made to the number of useful and beautiful substances by chemists during the last fifty years. Their number is legion, and their mere description fills volumes, whereas half a century ago a dictionary of moderate size would have sufficed for the purpose. Among these newly-discovered substances none are more remarkable than the metals rubidium, cæsium, thallium, indium, gallium, the existence of which was revealed by the spectroscope, and which, indeed, would have probably remained unknown but for the labours of Bunsen and Kirchoff in perfecting and applying that instrument.

I must not, however, omit all reference to a department of chemistry which has been, one may almost say, created within the time to which I am referring—I mean that of synthesis. When I began to study chemistry we only heard of analysis; of synthesis, so far at least as regards organic bodies, we only dreamt as a remote and unattainable region. The only instance then known of the synthesis of an organic substance was that of urea by Wöhler. Synthesis was, indeed. supposed to be an essentially vital process effected under the influence of the vital force, and quite outside the sphere of the chemist. Since then what marvels have we not seen? Alizarin and purpurin, the colouring matters of madder, have been prepared artificially by Graebe and Liebermann, indigo by Baeyer, not to mention bodies of simpler constitution obtained by comparatively less complicated processes. We are honoured to-day by the presence of Professor Ladenburg, who has succeeded in artificially preparing coniine, the alkaloid to which hemlock owes its poisonous properties; the first natural alkaloid, indeed, which has been obtained artificially. Looking back at what has been achieved I think we may entertain the confident anticipation that all the most important organic bodies, acids, alkaloids, and neutral substances will, in course of time, be obtained in a similar manner, though of one thing we may be pretty sure, viz., that we shall never succeed in forming any really organized matter as distinct from organic. The term organic matter is in fact only employed for the sake of convenience, and as an expression handed down to us from former days, since so-called organic compounds are subject to the same laws with regard to composition as the bodies which we name mineral or inorganic, but organized matter such as we find constituting the vessels of plants and animals is a different thing. The protoplasm contained in the vegetable and animal cell is something very distinct from the same matter after the death of the organism, but the difference between living and dead matter is not of a chemical nature. In referring to chemical synthesis I cannot refrain from expressing regret that so little has hitherto been done in the artificial production of minerals with a view to elucidating the processes by which they were formed in nature, but it is possible that more has been done in this direction than I am aware of, since this is a department of chemistry with which I am not familiar. It is certain that inorganic chemistry generally does not now receive the attention which it formerly did. The exclusive devotion to the chemistry of the carbon compounds which we find in most of our laboratories at the present day may, however, be accounted for when we see the brilliant results to which the study of these compounds has led.

After these few remarks on the development of chemistry during the last fifty years, of which I know a little, it may seem presumptuous on my part in the presence of some of the most eminent chemists of our day, whose opinions must be of infinitely more value than mine, to say anything about the future of our science and the direction it will probably take. Nevertheless, trusting to your kind indulgence, I will venture on some speculations in this direction, which, if they do not instruct the younger members of the Section, may serve to amuse their seniors, and at all events will refer to subjects on which some thought is well bestowed.

As regards the future of chemistry, the question has frequently suggested itself to me as it has doubtless done to others—Will chemical science go on expanding and developing during the next few generations as it has

done in the course of the last hundred years? Will discovery follow discovery, and fact be added to fact, until the record occupies not a few volumes only, but a whole library? Will systematic chemistry, *i.e.*, the history and description of all possible combinations of the elements, have any limits? I am inclined to answer in the negative. All human institutions pass through the same phases; they have their rise, they culminate, and decay; and I do not see why the science of chemistry should form an exception. Moreover, it is a natural law that whatever develops rapidly also declines rapidly, and the development of systematic chemistry since the commencement of this century has been perfectly unprecedented. I think it probable that in the course of time, at the rate at which we are now progressing, nearly all possible compounds will have been prepared, all the most important chemical facts will have been discovered, and pure chemistry will then be practically exhausted, and will be in the same condition as systematic botany and mineralogy now are. New compounds will now and then be discovered, just as new plants and new minerals now are, but nothing further will be brought to light that will affect the theories at which we shall then have arrived, whatever they may be. All the material with which the science has to deal having then been brought together, what will happen? Will chemical science cease? Will chemists, satisfied with past achievements, cease to work, confining themselves to practical questions and the history of the days gone by? I think not. The science will continue to develop, but it will be in other directions than those previously pursued. The exhaustion of systematic botany has not put an end to botanical science, for vegetable physiology has opened a wide field to the botanist, one that will take a long time to explore thoroughly.

To indicate the directions which chemical science will take in its various applications to other departments of knowledge, as, for instance, in connection with the study of the physical properties of matter, or in elucidation of the chemical processes whereby minerals have been formed, or those through which geological strata have passed in by-gone ages, would not be within my competency, as I should have to touch on subjects with which I am not familiar; but I may be permitted to refer by a few words to a subject, with which, by reading, at least, I have become better acquainted, and which seems to me to offer a wide field to the investigator who shall come well provided with physical and chemical knowledge to its cultivation. I allude to the processes whereby the substances constituting the various organs of plants and their contents are formed, and those again to which the decomposition and decay of vegetable matter are due; a subject as to which our knowledge is quite elementary, but which it seems to me admits of an extension and development of which we have at present not the least conception.

De Saussure, it is well known, first discovered the fact that plants under the influence of light absorb carbonic acid and give off oxygen, the inference of course being that the carbonic acid and the water present are decomposed, the carbon of the former and the hydrogen of the latter going to form the various organic constituents of the plant, while the oxygen or a part of it is set at liberty and poured into the atmosphere. The facts as they stand are simply these: what the plant requires for its subsistence is carbonic acid, water, nitrogen, in some form (presumably that of a nitrate), certain bases—potash, lime, magnesia, iron oxide, and phosphoric acid. Out of these it constructs the whole of its organic frame, its cells and their contents, re-arranging the elements of which its food consists in such a manner as to convert inorganic into organic matter, *i.e.*, changing bodies in which the affinities of the atoms are thoroughly satisfied into such as contain them in a state of more or less unstable equilibrium, and therefore liable to alteration, when their atoms are allowed to act in accordance with their natural affinities. More than this we do not know; our ignorance of the several steps or stages of the process, if there are any such steps, is complete; all that has been added to the general statement just given is mere speculation. Yet it is impossible to remain satisfied with the present state of our knowledge on the subject. Accordingly numerous attempts have been made to bridge over the chasm which separates the inorganic and organic worlds, not indeed to show that the change does not involve the creation, as was once supposed, of new matter—for this was proved long ago—but to exhibit in its details the hidden mechanism which produces it, but hitherto without success. We know that light is essential to the process of assimilation in plants, since this does not proceed in the dark, but this fact does not help us to an explanation, for light in this case is a mere stimulant, and never produces the same or similar effects outside the vegetable organism. Liebig and others have attempted to show that the process of assimilation in plants commences with the formation of some simply constituted body, such as oxalic or formic acid, with the elimination of oxygen, out of which by condensation and further separation of oxygen more complex bodies, such as sugar, fats, etc., are formed; but there is not the slightest evidence at present in favour of this view. The first product of assimilation that is distinctly recognized is starch, a highly complex organic, we might almost say an organized body, which appears at once with all its characteristic properties, like Minerva springing fully armed from the head of Jove. If we are to adhere to the facts so far observed, we must conclude that the plant does not proceed as we should do in the laboratory, beginning with the more simply constituted compounds and advancing to the more complicated, but that the reverse process is the one actually adopted, the supposed intermediate products being more probably the results of retrogressive metamorphosis. This conclusion is, however, so much opposed to ordinary chemical views that one cannot feel surprised at the constantly repeated attempts to clear up the question. There can be no doubt indeed that much here remains to be done and to be discovered.

(*To be continued.*)

Obituary.

Notice has been received of the death of the following:—

On the 26th of September, Mr. William Stott, Pharmaceutical Chemist, Sowerby Bridge, Yorkshire. Aged 70 years. Mr. Stott was one of the founders of the Pharmaceutical Society, having joined it in 1841.

On the 28th of September, Mr. William Friend, Chemist and Druggist, Winkleigh, North Devon. Aged 49.

On the 30th of September, Mr. John Cazeneuve Kite, Pharmaceutical Chemist, City Road, E.C. Aged 42.

On the 30th of September, Mr. Arthur Mason, Chemist and Druggist, St. Thomas Street, Weymouth Aged 55 years.

On the 1st of October, Mr. John Queenborough' Chemist and Druggist, West Street, Boston. Aged 48.

On the 6th of October, Mr. Robert Lathbury, Chemist and Druggist, Dorothy Street, Liverpool. Aged 82.

On the 6th of October, Mr. Henry Ostle, Chemist and Druggist, Witton Park, Durham. Aged 44 years.

On the 10th of October, Mr. Henry Walker, Pharmaceutical Chemist, Bernard Street, Russell Square, W.C. Aged 82 years. Mr. Walker had been a Member of the Pharmaceutical Society since 1842.

On the 12th of October, Mr. Thomas Hibbert Taylor, Chemist and Druggist, Cross Lane, Pendleton, Manchester. Aged 76 years.

On the 13th of October, Mr. Dudley William Smith, Chemist and Druggist, Southampton Street, Camberwell, S.E. Aged 65 years.

On the 17th of October, Mr. George Bell, Chemist and Druggist, Market Place, Hexham, Northumberland. Aged 75 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Teaching of Practical Pharmacy.

Sir,—I read with great interest the report of the discussion at the last meeting of the Council on the "teaching of practical pharmacy" in the Society's School. It has long seemed an anomaly that practical pharmacy should not be taught in what is nominally a school of pharmacy.

Undoubtedly there are many difficulties in the way of such a course. How can a student spare three or four months, out of a ten months' course, to practical pharmacy? and how can we obtain representatives all the year round of plants which are only to be obtained at certain seasons? These difficulties, however, have been surmounted in other countries—why not in this?

I take it that the endeavour would be to teach men the principles involved in pharmaceutical operations, such as they may be expected to carry out in their own pharmacies, rather than to give them practical experience in the manufacture of galenical compounds of the large scale. A short course of pharmaceutical physics would be good preliminary training, letting this lead up to the actual preparation of typical specimens, which, being prepared under the supervision of the director, and subsequently standardized, would be easily disposed of, if such a course were deemed advisable.

As a rule the quantities ordered in the Pharmacopœia are not large, and presumably the official characters of such preparations are those found when such quantities are used, slight variations taking place when the operations are conducted on a much larger scale, involving, in many cases, exposure to heat for a lengthened period. For example, manipulating with about a hundredweight of fresh belladonna, I have been able to prepare sufficient quantity of dried leaves, tincture, juice and green extract to meet the demands of a small pharmacy until the next season, and have found even the extract, prepared with careful attention at normal pressure, compare very favourably with one prepared *in vacuo*, when a much larger quantity was used. As three or four students could very well be engaged on one such preparation, the cost would be trivial, even if no further use were made of the finished product.

Difficulties in the way there undoubtedly are, but I hope they will be bravely met, and this reproach to our School removed.

130, *Fellows Road.* W. H. Symons.

Pharmaceutical Education in the Provinces.

Sir,—In your last issue, and under the above heading, you deplore the apathy which exists among chemists in the provinces on the question of education, and you might with equal justice have added—pharmaceutical affairs altogether. By inference you lay the entire blame for this state of affairs on the chemists of the provinces. In doing so, I believe you are somewhat unjust.

I believe the majority of the younger chemists equally deplore the want of centres around which they could rally, and whilst ready to admit their share of the responsibility, in so far that increased competition from all sides has made close attention to business imperative, and left but little time and energy for embarking on Quixotic efforts on behalf of future generations, they are, I believe, fully alive to the fact that pharmaceutical education must be progressive, and want but the stimulus of a little more attention to provincial affairs on the part of the Council, to come into closer relations with the Society than has existed hitherto.

The policy of the Council has been all through one of centralization and the catering for London members and the few from the country who are in a position to attend the meetings. The changes in the management of provincial affairs demanded by the times have been almost utterly neglected, and whilst deploring the want of interest country members and associates take in their proceedings the Council continues to appoint local secretaries on the old lines, instead of using the appointment as a means of enlisting the support and sympathy of those connected with the Society, which could effectually be done by making the appointment an annual one, and offering it in rotation to each member and associate in a district. Each member or associate who accepted office would then feel in duty bound to do something to advance the cause of education, ground upon which all can surely meet, and before long we should hear much less about the torpidity of provincial chemists.

In advancing this suggestion, I lay no claim to the idea, one which I am sure has occurred to many who see how ineffectually the present system works, nor do I for a moment wish to attach the slightest blame to the gentlemen filling these unsupported positions; all I know are good and representative men, and all will, I am sure, admit that under different conditions their office conld be made much more productive of good both to local and general pharmaceutical interests.

Plymouth. Robert F. Roper.

Chloroform as a Preservative.

Sir,—Mr. Blunt's interesting note on the preservation of damsons by means of chloroform reminds me that three years ago I made some experiments of a similar character, and with like results, on several of the firmer fruits, including cherries and plums. The only variation in the method was that I put the chloroform on cotton-wool in the hollow of the stopper. I extended my experiments to some of the medicinal plants, and have yet unopened a bottle of fresh digitalis leaves which have remained without sign of decay for three years. They quickly lost their green colour and became somewhat flaccid, but no further change in appearance has occurred.

Manchester. F. Baden Benger.

A Dispensing Query.

Sir,—Could any of your readers kindly inform me the best method of dispensing the following?—

℞ Tr. Gummi Rub.,
Eau de Cologne,
Tr. Myrthæ,
Glyc. Boracis . . . . . āā ℥j.

I mixed the last three first and then added the tr. gummi rub. a few drops at a time, when it remained clear for a day, after which it turned to a gelatinous mass. I have seen a bottle dispensed by another chemist which shows no signs of change although it has been made several days. The form for tr. gummi rub. I used was Squires in Martindale's 'Extra Pharmacopœia.' Could any one explain this, or could any other formula be used? J. H. P.

[*** The conditions of pectinization are not well known. Tincture of red gum and the old tincture of kino will often pectinize spontaneously, but the addition of a few drops of aqueous solution of borax to either causes gelatinization to occur immediately. The presence of glycerine retards the change, but it sooner or later will occur. Borax is, in fact, incompatible with these tinctures, as it is with mucilage of acacia. Hence the change referred to. We have failed to make the mixture clear, a gelatinous curdy precipitate forming at once.—Ed. Ph. J.]

Lindum.—It has been stated on the authority of Dr. Stutzer, Professor Salkowski and others that saccharine passes unaltered through the body and exclusively into the urine; but that it does not affect the quantity of urine passed or of the sugar contained in it. For further information respecting this compound see *Pharm. Journ.* [3], vol. xvi., pp. 837 and 1059; vol. xvii., pp. 162 and 346; and p. 337 in the present number.

J. H. Smith.—(1) Wemklyn's 'Water Analysis' (Trübner). (2) Hardwick's 'Manual of Photographic Chemistry' (Churchills).

"*Zodiac.*"—We are not sure that the design lends itself to description heraldically; but would assist you as far as lies in our power if you will specify the points that you wish to have explained.

Ajax.—We cannot undertake to publish your inquiry without a much fuller acquaintance with the circumstances than appear in your letter.

W.—Torilis nodosa.

Communications, Letters, etc., have been received from Messrs. Perry, Moore, Cooper, Allen, A. D. P.

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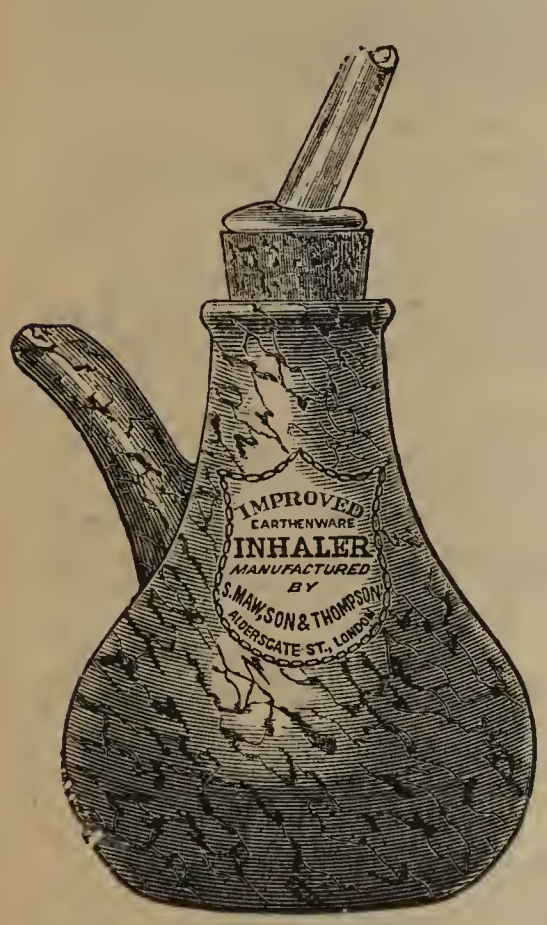

Fig. 8.

MAW'S IMPROVED.

Fig. 6.

MAW'S DOUBLE-VALVED.

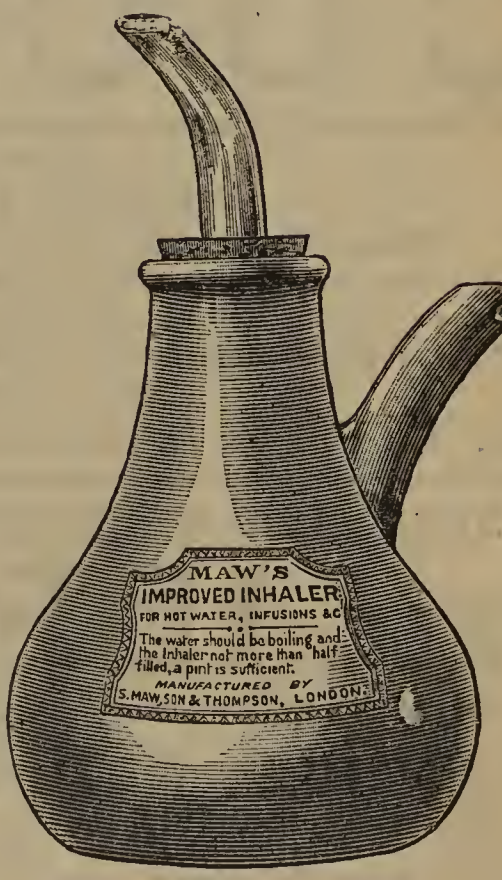

Fig. 8a.

MAW'S IMPROVED.

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Fig. 8.—Marbled, 32s. per dozen. Fig. 8a.—White, 21s. per dozen.

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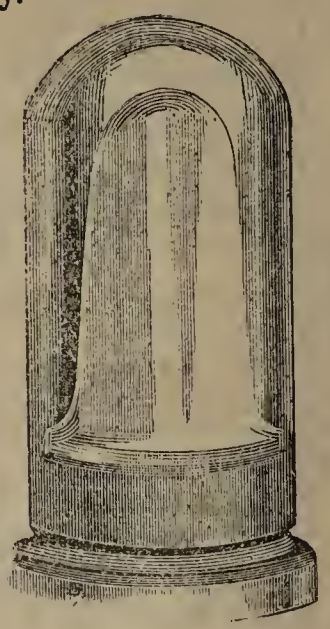

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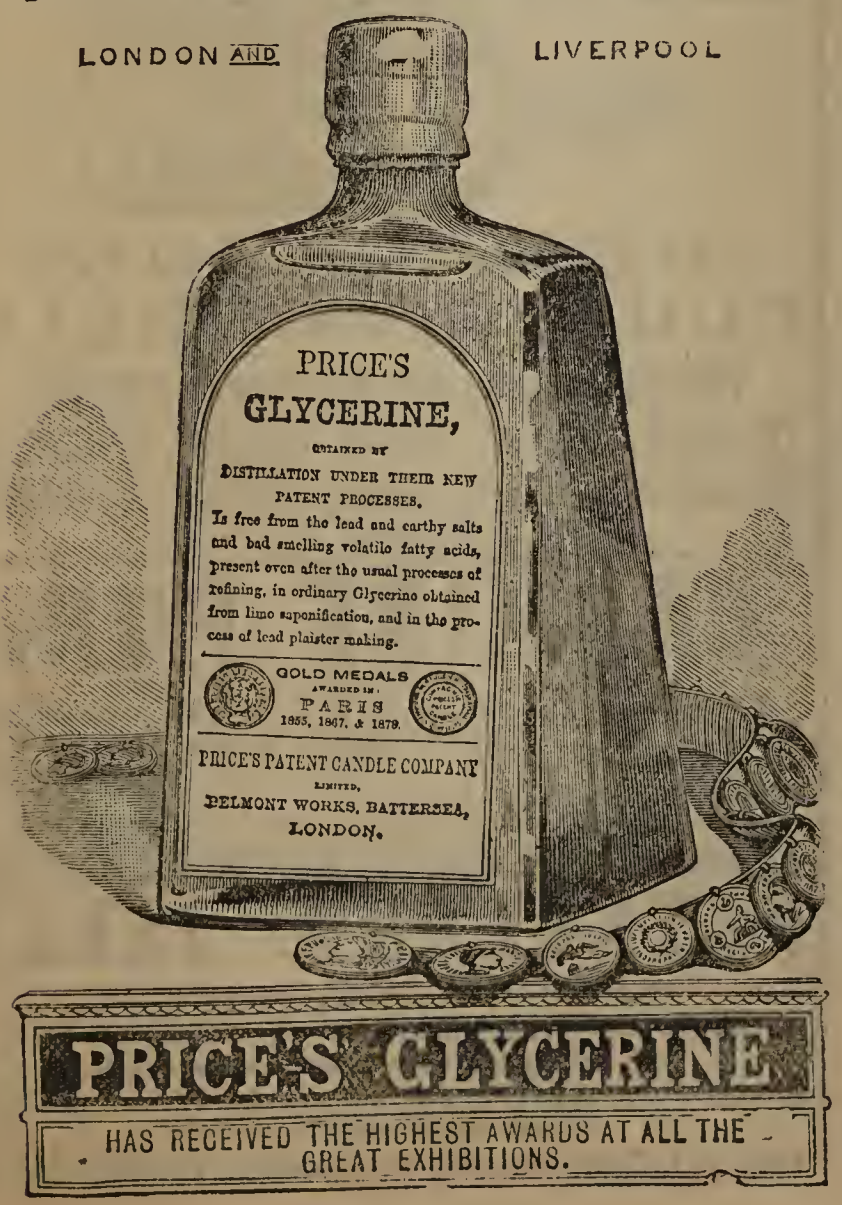

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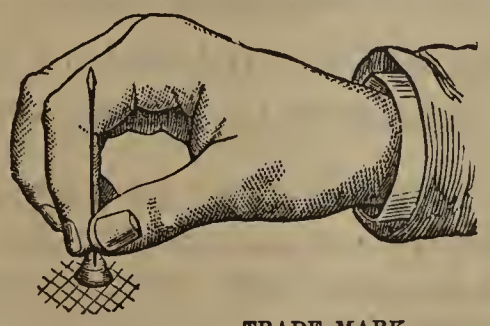

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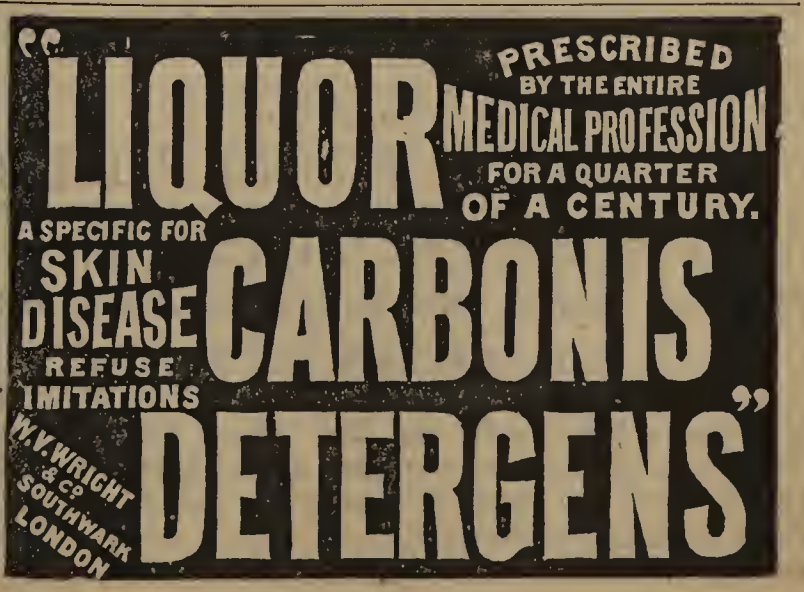

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EARLY in November. ASSISTANT for light Retail and Dispensing. Not under 23. Minor qualification preferred. Must be neat and reliable dispenser. J. T. B., 238, Belsize Rd., London, N.W.

A COMPETENT and reliable indoor ASSISTANT, not under 23 years' of age, of good address and experience. Must have good references. One desiring a permanency preferred. Apply, personally if possible, to Mr. BOWER, Pharmaceutical Chemist, 96, Tottenham Court Rd., London, W.

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A JUNIOR ASSISTANT. About 22 years of age. For good class mixed Retail and Dispensing. Good references required. State age, height, and salary, enclosing photo, J. MAPSON & SON, Stafford.

AT once. Good Junior ASSISTANT. One accustomed to Dispensing. Apply, T. W. LEAKE, 44, Hampstead Hill Gardens, N.W.

ASSISTANT. Out of doors. About 23 years of age. Must have had experience in a high class Dispensing business. Send particulars to Messrs. HITCHCOCK, High St., Oxford.

A JUNIOR ASSISTANT or IMPROVER for a quick ready-money business. Apply by letter, PROSSER ROBERT COMPY., Church St., Camberwell, S.E.

APPRENTICE wanted in Country Dispensing business. In-door. Every facility for learning the business, with a comfortable home. One passed Preliminary examination preferred. T. E. B. BLANKLEY, Dispensing Chemist, Banbury, Oxon.

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AN IMPROVER or JUNIOR of good appearance and address, for a first-class Retail and Dispensing business. Apply, stating age, height, and salary required to G. BAXTER, Pharmacist, Chester. Applications not answered in three days declined.

AN ASSISTANT for a few months. One accustomed to country business, who could take charge during absence of principal (if required). State full particulars, with references and salary, to J. BROWN & SON, 29, Westgate, Ripon.

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BY a Surgeon, a Dispensing ASSISTANT. One used to Counter, Prescribing, Extracting Teeth, and capable of attending to an ordinary case of midwifery on an emergency, preferred. Apply by letter, or personally between 11 and 12, at 86, High St., Whitechapel. Correspondents not answered declined.

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MESSRS. BERDOE & CO. have for transfer:—HOME COUNTY. Good class Retail, Dispensing and Prescribing trade. Returns £1450. Net profit £500. Price £1250. SURREY. Delightfully situated. Returns £600. Very little opposition. Price £500. ESSEX. Market town. Returns £700. Best position. Rent £25. Price £550. MIDLANDS. Retail and Prescribing. Returns £1000. Net profit £300. Price £500. WILTS. Retail, Prescribing and Proprietories. Returns £800. Net profit £300. Price £600. LONDON, S.E. Main road. Returns £850. Net profit £350. Price £800, or offer. W. Retail and Dispensing. Returns £330. Same hands 9 years. Price £225. Particulars of these and others free on application. 30, Jewry St., Aldgate, City.

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The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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Pharmaceutical Chemists,

MANCHESTER.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 905.] SATURDAY, OCTOBER 29, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 9th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday next, Nov. 2nd, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

SPECIAL NOTICE.

The following books are missing from the Library in London:—

Annalen der Chemie, Bd. 117-20, 213-16.
Art of Dispensing, 1885, 2 copies.
Attfield, Water and Water Supplies, 1884.
Beasley, Druggists' Receipt Book, 8th ed.
Bell, Analysis of Food, vol. 2, 1883.
Bentley, Structural Botany, 1883.
Bentley, Materia Medica, 1887.
British Pharmacopœia, 1885.
Davies, Microscopic Mounting, 1881.
French Codex, 1866.
Hardwich, Manual of Photographic Chemistry, 9th ed.
Martindale and Westcott, Extra Pharmacopœia, 2nd ed., 1884; 3rd ed., 1884.
Pharmaceutical Register, 1881, 1886.
Remsen, Theoretical Chemistry, 2nd ed., 1884.
Thorowgood, Materia Medica, 1st ed., 1874.
Wills, Practical Botany.

Members, Associates, and Apprentices are invited to examine their Libraries, and if any of the above-mentioned works be found therein, to forward such work or works to the Librarian of the Society.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 2nd day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 5th, 1887.

For list of approved Candidates see Journal, October 22, page ii.

There are at present *forty-six* annuitants, receiving £1575 per annum, and casual relief is also granted amounting in 1886 to upwards of £630, involving a total annual expenditure of more than £2200.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

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And to increase in the same proportion.

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Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-SIXTH SESSION, 1887—88.

COMMENCING OCTOBER 3rd, 1887.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.
Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

Professor WYNDHAM DUNSTAN.....CHEMISTRY.
Professor ATTFIELD ....PRACTICAL CHEMISTRY.
Professor GREEN ....BOTANY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.
Mr. HOLMES ....MATERIA MEDICA.

CHEMISTRY.

Lectures on Monday, Tuesday and Wednesday mornings, at 9 o'clock, comprising the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.
3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures. First Course, October to February. Second Course, March to July.

PRACTICAL CHEMISTRY.

Daily, at 10 o'clock, in the Laboratory, by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore enter for any period at any date. A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

BOTANY.

Lectures on Friday and Saturday mornings, at 9 o'clock, comprising the following subjects:—

1st Course.—Structural Botany, and the Physiology of the plant. October to February.

2nd Course.—Structural and Physiological Botany, but with especial reference to Practical Botany and the Classification of plants. March to July.

All the lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

MATERIA MEDICA.

Demonstrations in Vegetable and Animal Materia Medica every Thursday Morning, at 10. First Course from October to February; Second Course from March to July.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations every Tuesday, Thursday and Friday, at 5 p.m. First Course from October to February. Second Course from March to July.

Application for admission to the School, for Prospectuses, or for further information, may be made, personally or by letter, to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

TO ALL WHOM IT MAY CONCERN.

We hereby beg to notify that Dr. Otto Witté is no longer in our employ or connected with us in any way.

Respectfully,

Snow Hill Buildings, E.C.
October 18*th*, 1887.

BURROUGHS, WELLCOME & CO.

NOTES ON NEW REMEDIES,

INCLUDING THE

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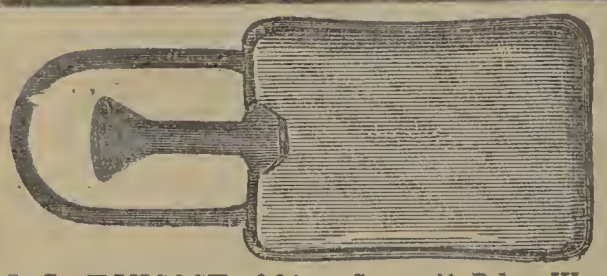

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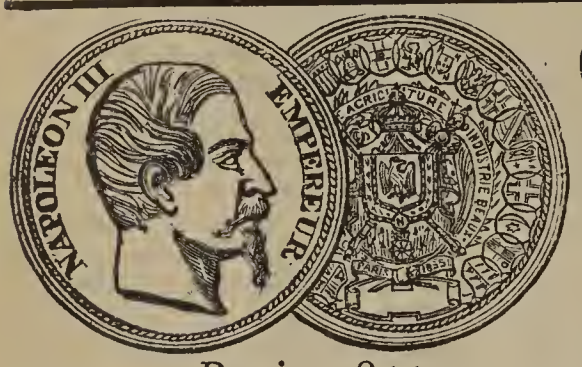

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Fig. 3.
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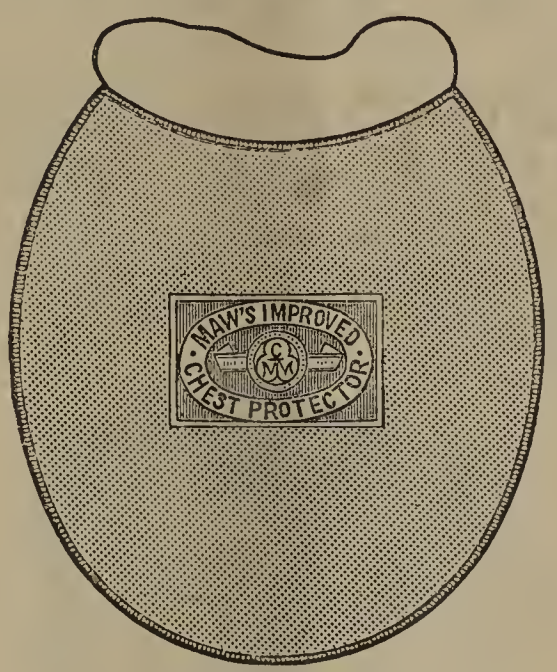

Fig. 4.
Single, Chest Protector.

Fig. 5.
Vest, a Shield for the Lungs.

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Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	,,	24/	32/	38/	46/
Fig. 4. Single	,,	9/	11/6	13/6	16/
Ditto, perforated	,,	11/	14/	16/	19/
Fig. 5. Vests ,,	,,	27/	34/	42/	51/

FELT, ASSORTED SCARLET AND WHITE.

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Fig. 3. Double, best,	per doz.	17/	22/	27/	33/	44/
Ditto, second	,,	14/6	19/	23/	28/	37/
Fig. 4. Single, best	,,	7/6	9/6	11/	14/	20/
Ditto, second	,,	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet	,,	17/	22/	27/	33/	40/

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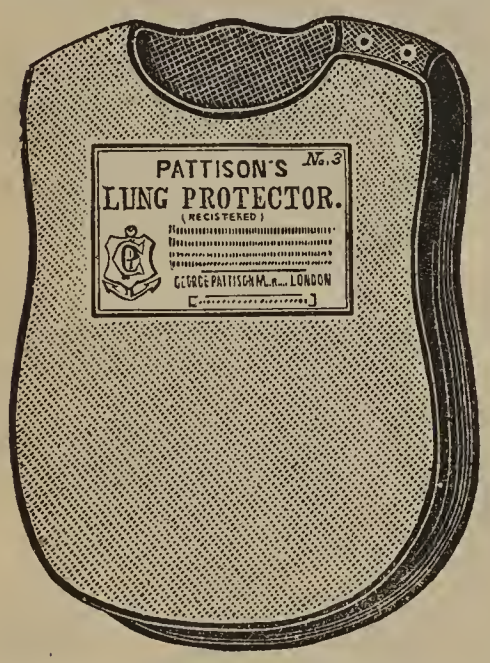

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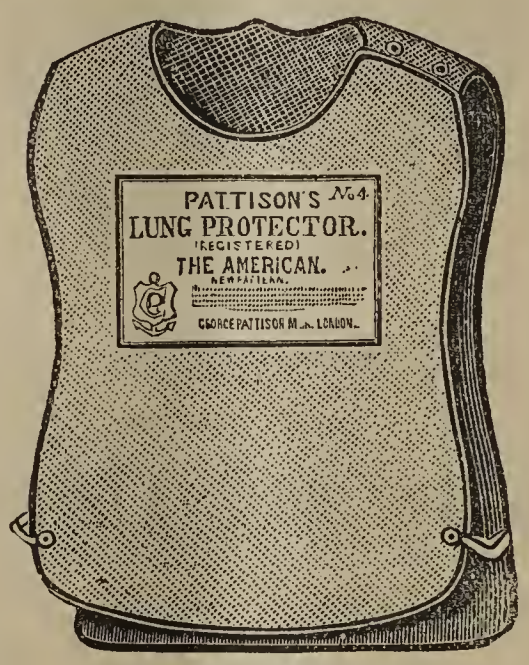

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THE AMERICAN

Lung Protector.
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THE AMERICAN, Seven sizes		20/-	28/-	36/-	44/-	54/-	62/-	72/-	„
THE CANADIAN, Seven sizes		22/-	30/-	40/-	50/-	60/-	70/-	80/-	„

FELT CHEST PROTECTORS.

	No. 00.	No. 0.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
Nine sizes	4/-	6/-	8/-	10/-	12/-	16/-	20/-	24/-	28/-	per doz.

All in Scarlet and White, and made in same Wool as the "Lung Protector."

FELT CHEST PROTECTORS, C. QUALITY. { Single .. No. 1, 7/-; 2, 9/-; 3, 11/-; 4, 14/-; 5, 18/- per dozen.
{ Double .. No. 1, 16/-; 2, 22/-; 3, 28/-; 4, 34/-; 5, 44/- „

These are warranted equal to BEST of other makers, but are NOT recommended.

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"THE MONTH."

Cocaine Hydrochlorate.

It appears evident from the many conflicting published statements that much more information is required for the elucidation of the nature of the so-called "amorphous cocaine." Dr. Squibb, returning to the subject (*Ephemeris*, Oct., p. 992), says that he has searched in vain in cocaine hydrochlorate manufactured by him for anything that answers to the published descriptions of amorphous salt or hygrine. In commercial samples of cocaine hydrochlorate he finds rarely less than 1 per cent. of a light brown sticky, odourless, bitter, neutral substance, non-irritant, and producing the cocaine impression upon the tongue, probably because it still contains cocaine; but as all reasonable means have failed to entirely free the salt from this substance, he infers that it is a continuous product at the expense of the alkaloid, due to manipulation. On several occasions he has supposed that he had found the amorphous cocaine salt, but in every case crop after crop of crystals was sooner or later obtained from it until only a very little sticky matter was left. Dr. Squibb says that his trials have always been in accord with the investigations of Dr. Stockman, reported in this Journal (vol. xvii., p. 861), excepting that instead of anything answering to the description of hygrine he has only obtained this sticky substance in very small proportion. Dr. Squibb also mentions some interesting observations as to the behaviour of cocaine hydrochlorate with chloroform. He finds that the solubility of the salt in chloroform is remarkably increased by the presence of small quantities of alcohol or water, and that this difference in solubility is sufficient to indicate the presence of moisture in a sample of the salt. Thus a dry salt requiring 5 c.c. of pure chloroform to dissolve 0·4 gram, after exposure to the atmosphere for two hours on a damp day only required 2 c.c. of the same chloroform to dissolve the same quantity. For this reason some commercial samples of cocaine hydrochlorate increase in solubility in chloroform upon being kept and other samples decrease.

Stenocarpine.

In a note on the reputed alkaloid stenocarpine, and its stated botanical source, the tear-blanket tree, the editor of the *American Journal of Pharmacy* points out that two only out of the eight cæsalpiniaceous trees known to grow in the United States are met with in Louisiana, only one of which, *Gleditschia monosperma*, Walt. (*G. triacantha*, Gaertn.) bears thorns, and that this tree is known in the Southern States as the water locust or occasionally as the water honey-locust. *Acacia stenocarpa* being a native of Abyssinia and Nubia, it is unlikely that this was the tree from which the alleged anæsthetic alkaloid is stated to have been obtained, and therefore the application of the name stenocarpine is, to say the least, exceedingly inappropriate. So far as *Gleditschia* is concerned the examination of its leaves by Paul and Cownley shows that they do not contain an alkaloid, and consequently there is every reason to believe the new alkaloid is merely mythical.

Ditana digitifolia.

Another suspicious remedy is the *Ditana digitifolia*, concerning the virtues of which as a galactagogue Professor Giurleo read a paper before the Italian Medical Congress at Perugia two years ago (*Pharm. Journ.*, [3], xvi., 542). Dr. Rusby, of Detroit, now states (*Ther. Gaz.*, Sept. 15, p. 588) that all attempts to ascertain directly or indirectly from Professor Giurleo what the plant is have failed, and no such name as he gives is known to botanists. Commenting on the evidence hitherto published, Dr. Rusby says that the plant is a botanical impossibility, and that the figure on p. 4 of Giurleo's pamphlet carries on its face the evidence of fraud.

Cocaine Chloromercurate.

The addition of mercuric chloride to solutions of cocaine hydrochlorate intended for ophthalmic practice has been recommended, and a preparation used on the continent under the name of "Sattler's solution," containing five grams of cocaine hydrochlorate and 2 centigrams of mercuric chloride to 100 grams of water, is generally esteemed to have antiseptic as well as anæsthetic properties. In experimenting as to the correctness of this assumption, Messrs Balbiano and Tartuferi found that when mercuric chloride is added to a solution of cocaine hydrochlorate a double salt is formed, having the composition represented by the formula—

$$C_{17}H_{22}NO_4Cl.HgCl_2$$

(*Ann. Chimica e di Farm.*, Sept., p. 157). The presence of this compound can be demonstrated by the formation of a white precipitate when the solution is moderately concentrated. The double salt was prepared separately, and was obtained as a white crystalline powder, melting at 122·5–123° C., and forming, upon cooling, a hard vitreous mass. It is only slightly soluble in cold water, 100 c.c. at 21° C. only taking up 0·536 gram, but it is still less soluble in 5 per cent. solution of cocaine hydros chlorate, 100 c.c. at 24° C. only dissolving 0·135 gram of the chloromercurate. Experiments were then made to test whether this compound confers any antiseptic properties upon solutions of cocaine hydrochlorate in which it occurs, the conclusion drawn being that in the proportion chloromercurate of cocaine is present in Sattler's solution (0·0425 per cent.) its influence as an antiseptic is negative.

Antipyrin Injections.

In order to avoid the pain consequent sometimes upon the subcutaneous injection of antipyrin a comparatively dilute solution is used when possible. But in cases where in order to give immediate relief it becomes necessary to inject a large dose, such as a gram of antipyrin, dissolved in a gram of water, Professor Sée adds 15 to 20 milligrams of cocaine hydrochlorate to each injection (*Archives*, Oct. 5, p. 450).

Iodoform as an Antiseptic.

Some explanation of the conflict evident in published statements as to the antiseptic properties of iodoform appears to be afforded by a paper recently read in Germany by Dr. De Ruyter (*Med. Press and Circ.*, Oct. 26, p. 403). The author confirms the statement that outside the body, whilst undecomposed, iodoform exercises no antiseptic action; but in the presence of pus at the temperature of the body the iodoform undergoes decomposition. This appears to be due to the influence of the pus cocci, since sterilized blood or blood serum was found to induce no chemical change in iodoform. Dr. De Ruyter says that the iodine liberated by the breaking up of the iodoform combines with ptomaines present, depriving these of their harmful properties, but leaving the cocci alive, though much reduced in activity.

The idea of utilizing the combustion of illuminating agents as a means of diffusing medicated

Iodine in Candles.

vapour is not a new one, for at least a dozen years since (*Pharm. Journ.*, [3], iv., 660), if not before, candles containing benzoin and storax were introduced as a remedy for bronchial irritation and spasmodic asthma. Messrs. Casson and Brownen now propose (*Med. Press and Circ.*, Oct. 5, p. 319) to use candles containing iodine and salicylic acid for the purpose of diffusing disinfectant and deodorant vapours in sick chambers. They state that iodine combined with salicylic acid can be readily and permanently incorporated with fats, paraffin, or wax, and that when candles made from such materials are burnt they evolve iodine and phenol in a vaporous form. The phenol is derived from the decomposition of the salicylic acid, and its presence can be demonstrated by the formation of trinitrophenol, or picric acid, upon passing the products of combustion through nitric acid. Its relative proportion, however, depends upon the rate of combustion, as if this goes on too rapidly and completely the decomposition is more thorough and no phenol is evolved. The iodine is simply volatilized, and its presence in the products of combustion can be detected by its action upon starch mucilage. It is stated that a faint odour of iodine becomes perceptible when these candles have been burnt in quantity in a close atmosphere. But the vapour has not been found objectionable, and it has even been productive of relief to patients suffering from asthma, spasmodic cough and hay fever; on the other hand it is reported to act powerfully as a deodorant, speedily removing the smell of the fumes of tobacco or sulphuretted hydrogen.

Methylal.

Methylal, to which attention was directed by Dr. Personali, about twelve months since, as a probably valuable anæsthetic and hypnotic (*Pharm. Journ.*, [3], xvii., 346) is the subject of an interesting editorial article in the *British Medical Journal* (Oct. 22, p. 894), in which a *résumé* is given of Messrs. Mairet and Combermale's further investigations into the physiological action of this compound. The conclusions arrived at are that methylal, although without effect in alcoholic mania and at the outset of simple mania, succeeds pretty generally in all other cases; but it is necessary sometimes to augment the dose when the system has become accustomed to it, or to interrupt its administration for two or three days. It is important to note that its action is purely somniferous and that its impression on the brain is evidently temporary; moreover, it causes neither depression nor disturbance of the nervous or nutritive systems. The sweet taste and ethereal odour of methylal and its solubility in water render its administration easy, the ordinary dose in cases of dementia ranging between three and five grams, though larger doses may be given. It appears to be unsuited for hypodermic injection in consequence of the intense pain it causes.

Benzol in Whooping Cough.

The administration of benzol in the treatment of whooping cough is the subject of a note by Dr. J. Lowe in the *British Medical Journal* (Oct. 15, p. 828), the object being to point out a method of obviating the effects of the hot pungent taste and its tendency to cause sickness. This result never occurs, Dr. Lowe says, if the benzol is given in a viscid mixture and the dose be not too large. The dose he has usually found sufficient is from three to five minims, but a smaller quantity has produced a decided effect, and for a child four or five years of age two minims every two hours will suffice. The form he recommends is—℞ Benzol puriss. ♏xxxii.; glycer. pur., ʒiss.; ol. menth. pip., ♏x.; syr. mori, ʒss. Misce. ℥j. 2dâ quâque horâ sumenda. The best time for commencing the administration of benzol in whooping cough is said to be after the acute stage is past.

Morphine Salts and Amyl Nitrite.

A correspondent in the *Pharmaceutische Zeitung* (Oct. 8, p. 579) calls attention to a difference in the behaviour of morphine salts towards amyl nitrite. Having to dispense a Belgian prescription ordering—morph. acet. 0·6, amyl nitros. gtt. xii., aq. dest. 30·0 for subcutaneous injection—he followed the instruction of the German Pharmacopœia that in all cases where morphine acetate is ordered morphine hydrochlorate should be used, "*quoniam est stabilius.*" After filtration the solution was sent out clear and almost colourless; but on the next day it was brought back, having assumed a red colour, the customer saying that no such change had occurred in previous supplies. A fresh quantity was therefore dispensed with the acetate, which was almost colourless and showed no darkening at the end of a week. A number of comparative experiments were then made under varying conditions of light and temperature, the result being that the solutions containing morphine hydrochlorate always became intensely red in eight or ten hours, whilst those containing acetate remained unchanged in colour. It is pointed out by the writer that the reddening of the solution depended upon the ready decomposition of the amyl nitrite, resulting in the formation of the yellow-red compound, nitrosomorphine, and that this would not have been particularly remarkable had it occurred with both the salts; but the experience in this case suggests that there are conditions under which morphine acetate, contrary to the official statement and generally received opinion, shows greater stability than the hydrochlorate.

Cubebin.

Cubebin, the peculiar crystalline principle of cubebs, has been further investigated by Herr Pomeranz (*Monatshefte*, viii., 466), who confirms the composition attributed to it by Soubeiran and Weidel, and represented by the formula $C_{10}H_{10}O_3$. Experiments to detect easily separable alkyl groups by heating cubebin with hydriodic and hydrochloric acids always gave negative results. In the oxidation of cubebin by potassium permanganate piperonylic acid was obtained. Upon trying to acetylize cubebin by means of acetic anhydride and anhydrous sodium acetate, instead of an acetyl derivative a compound was obtained having a composition represented by the formula $C_{20}H_{18}O_5 = 2C_{10}H_{10}O_3 - H_2O$. From these results it appears that cubebin is a derivative of pyrocatechin, containing a side chain C_3H_5O, which upon oxidation yields carbonyl, and that this side chain stands in the same relation to the two oxygen atoms of the methylenpyrocatechin residue as the carboxyl group of pyrocatechuic acid to the two hydroxyl groups of that compound.

Kreatine and Kreatinine.

In an article in the *Practitioner* (p. 257), by Dr. T. J. Mays, of Philadelphia, the physiological action of kreatine and kreatinine is discussed. From the experiments he has made with solutions of these bodies on the heart of the frog he comes to the conclu-

sion that their action is similar to that of blood and milk in sustaining the contraction of the heart, and that although it may be true that they are the products of a destructive metamorphosis, beginning with the albuminoids and ending with urea, yet that their influence as nutritive agents compares favourably with a 2 per cent. blood solution. A similar stimulant action on the heart was not shown by asparagin, theine, or caffeine, and only to a very slight extent by sarcine (or hypoxanthine) and xanthine, which are also constantly present in muscular tissue. It is therefore to kreatine and kreatinine that Dr. Mays believes the stimulant and nutritive virtues of extract of meat, which contains these bodies, to be chiefly due.

Aromatic Waters.

In this country the official process for the preparation of aromatic waters from essential oils consists in distillation; but in the United States it gives place to an artifice for mechanically breaking up the oil into small particles and so rendering it more readily diffusible through the water. In the U.S.P., 1870, trituration of the oil with magnesium carbonate was ordered, but this was open to the objection that a minute quantity of magnesium salt was dissolved in the water, sufficient sometimes to yield a precipitate or even to be incompatible with certain salts. The U.S.P. 1880, substituted cotton as an absorbent and distributor, but this, whilst yielding excellent results so far as clearness and saturation of the water are concerned, is alleged to induce fungoid growths. Dr. C. O. Curtman has therefore been experimenting with various substances with a view to further improvement, and in a paper read before the American Pharmaceutical Association he reported that he had obtained the best results with talc that had been purified by boiling with dilute hydrochloric acid so as to remove all traces of iron. German *kieselguhr*, similarly freed from iron, also gave excellent results, but required to be used in larger quantity. It will be remembered that the Pharmacopœia Londinensis in an alternative process ordered the use of ground silica for this purpose.

Liquor Gutta Percha.

In another paper read before the American Pharmaceutical Association, Mr. J. M. Good proposed to abandon the use of carbonate of lead in the preparation of liquor gutta percha and to considerably increase the quantity of chloroform. He prefers to use four parts of gutta percha to ninety-six parts of chloroform, the solution being made in a wide-mouthed bottle and then filtered in a closed vessel. The product is described as being clear even to brilliancy, but it is evident it would contain a much smaller quantity of gutta percha than is at present ordered in the B.P. and U.S.P.

Rhamnus Frangula and Purshiana.

In the latest number of the *Ephemeris* (p. 984), Dr. Squibb raises the question as to the necessity for including both cascara sagrada and frangula bark in the Pharmacopœia, and expresses the opinion that one or the other is superfluous. In order to help to a decision as to which should have the preference he has placed preparations of the carefully selected barks at the disposal of suitable persons for comparative experiment. Meantime Dr. Squibb displays an evident preference for the bark of *Rhamnus Frangula*, which he finds to come into the market of much more uniformly good quality than the bark of *R. Purshiana*.

Aristolochia reticulata.

According to an analysis made by Mr. Ferguson (*Amer. Journ. Pharm.*, Oct., p. 481) of the rhizome of *Aristolochia reticulata*, Nutt., which is the drug usually met with in this country as serpentary root, the active principle is not a glucoside, but an alkaloid. This was obtained in the form of light yellow needle-shaped crystals, inodorous, very bitter, and soluble in water, 95 per cent. alcohol, ether, chloroform and benzol. It should be remarked, however, that the alkaloid was obtained by treating the alcoholic extract with water acidulated with sulphuric acid, a treatment that would probably result, especially if heat were used, in the decomposition of any glucoside present.

Collinsonia canadensis.

In a paper read before the Therapeutic Section of the International Medical Congress (*Brit. Med. Journ.*, Oct. 1, p. 712), Dr. J. V. Shoemaker directed attention to the value of *Collinsonia canadensis*, or stone root, in acute cystitis. He considers it to be one of the most valuable of the indigenous American medicinal plants. Hitherto it has formed a popular domestic remedy for gravel and other urinary affections. Dr. Shoemaker finds it useful in incontinence of urine in children due to spasmodic contraction of the bladder. In painful hæmorrhoids dependent on the spasm of the sphincter, he believes that suppositories made with the root will prove most efficacious in the majority of cases. Its antispasmodic action is also manifest in various forms of colic and gastralgia. In lumbago, relaxation of the uvula, chorea and whooping cough it has also proved of service, while externally it constitutes an excellent application to contused and incised wounds and indolent ulcers. Ascarides are destroyed by a rectal injection of the fluid extract diluted with 4 parts of water. The most available preparation is the tincture, the dose of which ranges from 10 to 30 drops for children, and 1 to 2 drachms for adults.

Indian Ipecacuanha.

A small quantity of ipecacuanha root grown in India has recently been sent to this country, and is at present undergoing a chemical examination, with a view to determine its relative percentage of emetine as compared with that of Brazilian growth. According to a brief note in the *Pharmaceutical Record* (Oct. 1, p. 316) the experiments made with regard to its cultivation have shown that the plant flourishes best at Nilambur.

Unusual Drugs at Drug Sales.

At the drug sales recently a root was offered under the name of Carthagena ipecacuanha, which, however, was not that drug, but the root of *Psychotria emetica*, which was stated by Pelletier to contain emetine (Per. 'Mat. Med.,' 1st ed., vol. ii., pt. ii., p. 66, fig. 9). When freshly cut its transverse surface presents a purplish-black cortical portion surrounding a yellow porous woody axis. On exposure to the air, however, the purplish colour gradually fades. Another drug, offered under the name of Coowarie seed, was derived from *Cassia Tora*. These seeds are considered of value in India for ringworm, and for this purpose the powder is mixed with the oil of *Pongamia glabra*. Mahommedan writers on medicine recommend the seeds in skin diseases in which induration is present, *e.g.*, leprosy cheloid, etc. For these diseases the seeds are rubbed into a paste with butter-milk or lime-juice.

An interesting paper on the cultivation of cin-

chona in Bolivia, read by Dr. Rusby before the American Association for the Advancement of Science, appears in the *Pharmaceutical Record* (Oct. 1, p. 305). The author admits the great tendency of the plants to hybridize, and the difficulty of referring the various forms to their proper position, and seems to rely on the venation of the leaves as affording the best distinctive character for the different species. He points out that every species, variety and hybrid, is represented in the native classification, with one exception, by three forms, *morada*, *verde*, and *verde morada*, that is, red, green and red-green, according to the colour of the leaves. On every tree there are two very distinct forms of leaves, viz., those growing on the lower or flowering branches, and those on the young, upper and flowerless branches of the present year's growth. The latter are usually broader and more abruptly acuminate at the base, sometimes appearing even decurrent on the petiole. They are more membranous, and the pubescence when present is more pronounced. The old tabla, or flat bark, is now almost unknown, the bark being collected either in shavings, or in quills two feet long. The latter are collected from March to June, at the close of the raining season, when the bark strips more easily. The shavings are taken from the top and branches after the tree has been cut down, and are much adulterated, since admixture is less easily detected. The natives prefer decoctions or infusions of the bark to the extracted alkaloid, alleging that a fever cured by the former stays away longer than when treated by the latter. The gelatinous young terminal buds are crushed and applied to fresh wounds, and are said to produce excellent stimulant and antiseptic results.

Cinchona in Bolivia.

An analysis of the pods of *Cæsalpinia brevifolia* is given in *Leather* (Oct., p. 72) by Mr. W. N. Evans. These pods are remarkable for the large amount of tannin they contain, the fibrous portion containing 11·02 per cent., and the gummy or resinous looking portion 66·94 per cent. The seeds, however, form 22·86 per cent. of the weight of the pods. The import of this tannin material is stated to be about two hundred tons yearly.

Cæsalpinia brevifolia.

The class of bodies to which the name tannin is applied, although known to include a large number of modifications, has hitherto been usually looked upon as exclusively of vegetable origin, but M. Villon now reports (*Chem. News*, Oct. 21, p. 175) the occurrence of a tannin in animal tissues. As far back as 1810 M. Penunt announced that he had found gallic acid in the corn weevil (*Calandra granaria*), and it is from this insect that tannin is now said to have been obtained, the yield being about 3 per cent. of its weight. The process consisted in treating the residue from evaporation of an alcoholic extract of corn weevils with acetic ether, diluting the solution with half its volume of water, adding ammoniacal zinc acetate, and then decomposing the resulting precipitate by heating it in water containing enough oxalic acid to throw down all the zinc. The animal tannin, or "fracticornitannic acid," is described as occurring in small reddish-yellow scales, soluble in water, aqueous ether, alcohol, and chloroform, and possessing all the general properties of the tannins, such as precipitating gelatin, albumen, etc. It is also a precipitant of alkaloids and gives a bluish-black coloration with ferric salts. The results of analysis are stated to have corresponded with the formula $C_{28}H_{16}O_{16}$, and the compound was found to be split up by sulphuric acid into glucose, gallic acid, and an amorphous red substance analogous to phlobaphene.

Animal Tannin.

It is a noteworthy fact concerning yellow berries (*Rhamnus infectorius*) that in proportion to the diminution of their export to the United Kingdon, there has been an increase in that to Germany and the Continent (*Gard. Chron.*, p. 432). An important contribution to our knowledge of these berries is published by Professor H. M. Ward and Mr. J. Dunlop in the first number of the new periodical entitled the *Annals of Botany*. It has long been known that a beautiful yellow solution can be obtained by simply macerating the entire fruits in water, but that dyers find it necessary to crush the fruits in order to obtain a satisfactory dye, which the pericarps alone do not yield. In order to determine the cause of this, experiments were made with the integuments, etc., of the fruit of *R. infectorius*. In 1879 Messrs. Liebermann and Hormann had ascertained that the dye exists in the pericarp, and consists of the glucoside xanthorrhamnin, which under the action of some ferment in the fruit splits up into rhamnin and glucose. Mr. E. Lightfoot had also shown that when to a clear decoction of the pericarp, a portion of either the endocarp, endosperm, or of the infolded rim of the seed of the embryo was added, in every case a yellow powder (rhamnin) was formed and deposited, but more quickly when the rim of the seed was added; also that this action was destroyed by boiling. The experiments made by Messrs. Ward and Dunlop show that the ferment really resides in the raphe or adherent funicle of the seed, which is adherent to the testa proper all along the sides of the groove of the seed. When the intact fruits are soaked in water the ferment is dissolved and acts on the xanthorrhamnin in the pericarp, but the precipitate of rhamnin which is formed is withheld chiefly inside the fruits, thus explaining why the dyers should crush the fruits, since it is the insoluble semi-crystalline precipitate that they want. The authors examined also the ripe fruits of *Rhamnus tinctorius*, W. and R., *R. Carolinianus*, Walter, *R. Wicklius* and *R. catharticus*, L., but found no trace of the ferment in either of them, for neither would the seeds of these species precipitate rhamnin from an extract of the pericarps of *R. infectorius*, nor did the seeds of the latter cause any precipitate when added to an extract of the fruits of the four species mentioned. The purple or brown solutions afforded by them, however, all contained glucose, and a few drops of ammonia turned them of a green colour. The authors suggest that the bitter and resinous character of the seeds may be of use to the plant in protecting it from birds, and that the glucose in the pericarp may be intended for the benefit of the young plant, since attempts to make the seedlings grow have frequently failed, and the authors have only been able to obtain seedlings from the whole fruits.

Yellow Berries.

A process for effecting the direct saccharification of starch whilst still enclosed in the uncrushed cellular tissue of amylaceous vegetable substances, and of withdrawing the soluble products, has been described by Messrs. Bondonneau and Foret (*Compt. Rend.*, cv., 617).

Saccharification of Starch.

They state that if the amylaceous material—maize, for instance—be macerated at a temperature of 90° too 100° C. in water containing one or two per cent. of acid, the acid gradually penetrates the tissue, and under the influence of the temperature saccharifies the starch grains in the containing cells, and that the products of the saccharification will then diffuse through the cell-walls into the surrounding liquid without the cellular tissue undergoing any apparent change. When the operation is complete the insoluble residue is said to no longer contain any starch, but to then constitute a very valuable fodder for cattle. The process is reported to have already found industrial application, apparatus having been erected in France allowing of the treatment of five thousand kilograms of amylaceous material at each operation.

Cetraria islandica.

The substance occurring in considerable quantity in *Cetraria islandica* and other lichens, to which the name "lichenin" has been given, has been the subject of an investigation by Messrs. Hönig and St. Schubert (*Monatshefte*, viii., 452). They found that a hot water extract of *Cetraria islandica* contains two carbohydrates. One, which constitutes the principal part of the extract, and for which the authors propose to retain the name "lichenin," is a gelatinous body, difficultly soluble in cold water; it is not coloured blue with iodine, possesses no rotatory power, and dissolves in hot water, forming an opalescent liquid. Upon boiling with dilute acids lichenin yields, together with optically inactive dextrin, a readily crystallizable grape sugar, the lichenin being converted more readily than cellulose, and with a facility comparable to that shown by starch. This specially easy conversion of lichenin into crystallizable grape sugar would appear to be of some practical importance, since the quantity of it contained in Iceland moss is very considerable, while in many districts the raw material would be easily obtainable. The other carbohydrate present in the hot water extract the authors propose to designate "lichenin starch," since it appears to possess only the properties and behaviour of soluble modifications of starch.

Chemical Action of Light.

The influence of sunlight upon some compounds of the halogens is well known, the partial decomposition of ordinary aqueous hydrochloric acid with liberation of chlorine being a familiar instance. Some experiments have been made by Dr. A. Richardson to ascertain the influence oxygen might exert on this reaction (*Indust.*, Sept. 30, p. 379). It was found that on exposing to direct sunlight a bulb containing a mixture of hydrochloric acid gas and oxygen, in proportions corresponding to $2HCl+O=H_2OCl_2$, the gases being saturated with water vapour, decomposition went on to the extent indicated by the presence of ·35 per cent. of the chlorine in the free condition at the end of twenty days. But when a large excess of oxygen was employed, under otherwise similar conditions, the proportion of chlorine found free at the end of twenty days amounted to 73·72 per cent., clearly illustrating the influence of mass in chemical reactions. Upon repeating the experiment with the gases in a dry condition no free chlorine was found upon opening the bulbs at the end of sixty days, and even a mixture partially saturated with water vapour gave the same result, indicating that the presence of a quantity of water vapour sufficient to saturate the gases is an essential condition to the decomposition. In a similar manner hydrobromic acid, in the presence of oxygen in the limited proportion and the mixture being saturated with water vapour, yielded ·06 per cent. of its bromine in the free condition at the end of forty-six days, and with excess of oxygen 7·6 per cent. after forty-five days. When the dry gases were exposed no decomposition of the hydrobromic acid was observed. On the other hand, hydriodic acid was decomposed by oxygen under the influence of actinism, whether dry or moist.

Endosmose, Dialysis and Osmose.

According to M. Leplay (*Chem. Zeit.*, C. R., Oct. 23, p. 246) the phenomena of endosmose, dialysis and osmose, which are frequently considered as identical, should be sharply distinguished one from another. Dutrochet's endosmose depends upon the efforts of two liquids of different density, separated by a membrane, to establish compensation for this difference. Graham's dialysis depends upon the efforts of solutions of different density and chemical composition to establish compensation where possible in respect to both qualities, but at least in regard to the latter. Dubrunfaut's osmose, on the contrary, tends to hinder the establishment of a condition of equal weight. To enable the author to study these phenomena he has constructed an apparatus consisting of two easily emptied chambers, separated by a membrane and provided each with an ascending tube. It was found that in the endosmose of water and sugar solution the endosmotic current is capable of producing differences of level in the two tubes of upwards of ten metres, and that the levels do not become constant until the pressure of the endosmotic current on one side equals that on the other; whereupon dialysis gradually takes place, *i.e.*, the equalization of the sugar contents. Gum solution against water produces a slow endosmotic current, only water from the gum solution and no gum passing into the water. But when sugar is added to the gum solution the current becomes more rapid, both sugar and gum passing through the membrane into the water, showing that a sharp separation between colloids and crystalloids cannot be drawn, since they may reciprocally influence one another in their behaviour.

Industrial Preparation of Oxygen.

A recent number of *Industries* (Oct. 21, p. 457) contains an interesting description of Brin's process for the preparation of oxygen from atmospheric air, which is based upon the fact that barium monoxide when heated to low redness is capable of absorbing oxygen and becoming converted into barium dioxide, and that at a higher temperature this oxygen is again given off and the dioxide reduced to monoxide. This reaction, which was first pointed out by M. Boussingault, is a well-known one, but its industrial application has been hitherto hindered by the experience that baryta after being used for a time seemed to lose its power to absorb oxygen. Messrs. Brin ascertained by experiment that this failure was due to molecular and physical changes caused in the baryta by impurities in the air and the use of a high temperature in decomposing the dioxide. In their new process therefore the air is submitted to a preliminary purification by passing it through layers of quick-

lime and caustic soda, to remove carbonic anhydride and moisture, whilst by operating in a partial vacuum the dioxide is decomposed at a temperature of about 800° C. Under these conditions it is found that the same baryta can be used indefinitely. The air is drawn through retorts containing baryta in lumps heated to about 600° C. until the gas at the outlet fails to extinguish a glowing match, which usually occurs in one and a half or two hours. The temperature is then raised and the action of the pump reversed so as to draw off the oxygen as it is evolved.

Oxygen in Coal Gas Purification.

One of the directions in which a cheap supply of pure oxygen might find application would seem to be the purification of coal gas. It is known that in the oxide of iron process for removing sulphur compounds the admixture of about 3 per cent. of atmospheric air with the gas before passing it into the purifiers will cause the liberation of sulphur almost as soon as it has been absorbed by the iron oxide, thus dispensing with the "revivification" process. This practice, however, is open to the objection that it introduces into the gas a quantity of useless nitrogen and materially reduces the illuminating power. But Mr. Ogden has found that the admixture of 1 per cent. of oxygen effects the same chemical reaction more thoroughly and at the same time increases the illuminating power of the gas one candle unit. It is stated that the corporation of Blackburn has arranged for the erection of an oxygen apparatus at the town gas works, and expects to effect considerable economy by the application of Mr. Ogden's observation.

Adventitious Roots.

A true root has been described as a direct prolongation of the stem downwards into the earth. Adventitious roots are formed in various parts of the plant, and sometimes in unusual and unexpected places, as in the case of a cucumber figured in the *Gardeners' Chronicle* (p. 433, fig. 91), in which roots were protruded from the interior of the stalk end of a cucumber fruit that had been immersed in water. This is explained by the fact that the outer part of a cucumber is a direct prolongation of the stem. The fruits of Opuntias have been observed to root in the same manner, but an instance of the cucumber doing so does not appear to have been previously noticed.

Onion Disease.

The latest "Bulletin of Miscellaneous Information" issued from the Royal Gardens, Kew, contains an interesting account of the results of an official inquiry conducted by Mr. Arthur Shipley into the conditions affecting diseases attacking the onion in the Bermudas, where the crop has recently become an important one, in consequence of it being there somewhat early. Mr. Shipley found the principal disease to be a fungoid one, occurring also in this country, and due to the *Peronospora Schleideniana*, which attacks the leaves. The fungus is perpetuated through the winter, as in the case of the allied disease of the potato, by resting spores, which are capable of retaining in the earth their power of germination for two or three years, and the atmospheric conditions that favour the progress of the disease are heavy dews or rains, followed by warm, moist, calm weather, and the absence of direct sunshine and cold winds. Mr. Shipley makes certain practical suggestions for combating the disease, based upon the observed facts.

IRISH MOSS GELATIN.*

BY EMLEN PAINTER.

As a member of the National Formulary Committee, it fell to my lot to investigate the emulsions, and in pursuance of this duty, I made samples after all the different formulæ for emulsions that had come before us.

A mucilage of Irish moss appeared to the Committee to be the most satisfactory emulsifier for fixed oils. Although it did not so minutely divide the particles of oil as some other agents, it made a more uniform and permanent emulsion in the hands of different manipulators than any other agent tried, and it was finally adopted by a unanimous vote of those present.

The Chairman of the Committee suggested that it would be very desirable if this mucilage could be preserved, or more readily prepared than by the somewhat tedious and roundabout method in use. To this end I made a few experiments. Alcohol being satisfactorily employed to preserve the emulsion, it occurred to me that the mucilage might possibly be preserved indefinitely in the same way, and thus kept ready for use whenever desired. Upon trial, however, I discovered that when the quantity of alcohol used in the formula for emulsions was added to the mucilage first, the emulsifying property of the mucilage was very materially lessened—and, in fact, it was rendered totally unfit for the purpose.

I next took a quantity of mucilage of Irish moss, as prepared for making the emulsion, and evaporated it in a water-bath to a thick syrupy or semi-fluid consistence, and with a small brush spread it upon plates of glass to dry. In the absence of a drying closet, these plates of glass were placed over gas stoves, elevated a foot or more above the flame, and with a sheet of wire gauze intervening. In a short period of time the mucilage or rather gelatin—as it may more appropriately be named in its changed form—became hard and dry and began to peel off of the plates in the hottest places, in thin wafer-like scales.

The yield of gelatin from the Irish moss used (which, however, was not completely exhausted by my mode of manipulation) I found to be about 70 per cent. In the mucilage for emulsions, made in the same way, 60 grains of moss were used in making 5 ounces of mucilage, this quantity being required to make 1 pint of a 50 per cent. emulsion of oil. Therefore, 40 grains of the Irish moss gelatin practically represents the quantity required to make a pint of emulsion of oil.

Whilst this gelatin is but slowly and sparingly soluble in cold water, it dissolves completely in hot water, and a mucilage may in this way be prepared in a comparatively short time.

The following formula was proposed for

Emulsion of Cod Liver Oil.

Irish moss gelatin.	40 grains.
Boiling water	5 fl. ounces.
Cod liver oil	8 „
Syrup tolu	2 „
Alcohol	1 „
Oil sassafras	10 minims.
Oil wintergreen	10 „
Old bitter almond	2 „

Dissolve the gelatin in the boiling water, taking pains to have it completely in solution, transfer the mucilage formed to a pint bottle, gradually add the oil in divided portions, and shake the bottle vigorously after each addition and until a perfect emulsion is formed, then incorporate the syrup, and lastly add the alcohol in which the essential oils have previously been dissolved, and shake well together.

If preferred, this emulsion may also be made in a mortar in the usual way, and it is probably better to let

* Read at the thirty-fifth annual meeting of the American Pharmaceutical Association. From the *Pharmaceutical Record*, September 20.

the mucilage become perfectly cold before proceeding further with the emulsion.

Irish moss gelatin may be readily prepared in a small way by the following method :—

Take of good bleached Irish moss a convenient quantity, wash it well with cold water, and place it in a boiling-water bath, with about fifty times as much hot water, stir frequently, and continue the heat for about fifteen minutes, then transfer the mixture to a strong muslin strainer of open texture, and with moderate pressure strain off the mucilaginous liquid. To obtain a larger yield the undissolved portion may be returned to the water-bath and treated a second time with about one-third the quantity of water, and strained as above. The strained liquid is then evaporated in the water-bath to a proper consistence in the manner before described, and spread upon plates of glass to dry.

The gelatin prepared as above is designed only for emulsions or other opaque mixtures. Irish moss mucilage, however, is admirably adapted for other pharmaceutical uses.*

If a perfectly clear mucilage is desired, the solution of Irish moss must be filtered through paper before evaporation. This may be readily accomplished by first diluting the mucilaginous liquid before described with two or three times its volume of water ; the filtration will be greatly accelerated also by loosely filling the plaited paper filter with absorbent cotton before pouring in the liquid.

Some further experiments were made with the view of producing Irish moss gelatin by a process adapted to a more extended scale of operation, entailing less labour, and with the endeavour to furnish an article suitable for any purpose for which the gelatin is useful. I made use of a percolator which I had previously constructed for making syrup of coffee. It consists of a cylindrical metallic percolator, eighteen inches high, tapering slightly, and from four to six inches in diameter. This percolator is surrounded by a water-jacket. The lower extremity of the percolator terminates in a tube three-eighths of an inch in diameter, which is bent at right angles, and passes through the side of the water-jacket, the tube terminating in a three-eighths inch bibb. I had made of "cheese cloth" a long conical-shaped bag of about one-half the capacity of the percolator. This bag was filled with selected Irish moss (holding half a pound), which had been previously washed in cold water—then suspended in the percolator, the water-jacket and percolator both filled with water, and the apparatus placed over the fire. After being kept at the boiling temperature for about two hours the bibb was opened and a perfectly clear mucilaginous liquid drawn off, which upon evaporation, and speading upon plates of glass, as before described, yielded a beautiful transparent gelatin. This gelatin, when dissolved in hot water, makes a perfectly clean mucilage.

The Irish moss will not be nearly exhausted by this one operation, but the percolator can be repeatedly filled, heated and drawn off as before, until nearly all the soluble portion is obtained.

The water-bath is not absolutely necessary in making the mucilage in this way, although I found it to make a nicer product than without it, using this same strainer cloth ; if a thicker strainer was used, it would possibly make as clear a solution without as with the water-bath.

For convenience, and a saving of much labour, the mucilage may be drawn directly into shallow trays, and these placed in a well-heated drying closet, or by other suitable means evaporated to dryness. Thicker sheets of gelatin are obtained by this method, which answer every practical purpose ; a little longer time only is needed to dissolve them.

* See paper read before Pharmaceutical Society of Great Britain by Peter Boa. *Pharm. Journ. and Trans.*, May 21, 1887.

NOTES ON ESSENTIAL OILS AND ALLIED PRODUCTS.*

(*Concluded from page* 344.)

Yield of Essential Oil by Drugs and Plants.

In the following list the figures given represent the quantity in parts by weight of essential oil, which in the experience of Messrs. Schimmel is yielded by 100 parts of the raw material mentioned. The botanical names used by Messrs. Schimmel have been retained, although in some cases they differ from those now applied to the respective plants in this country.

Ajowan Seed (*Ptychotis Ajowan*).—3 per cent.
Almonds, Bitter (*Amygdalus amara*).—4 to 7 per cent.
Angelica Seeds (*Archangelica officinalis*).—1·15 per ct.
Angelica Root, Thuringian (*Ditto*).—0·75 per cent.
" " Saxon (*Ditto*).—1 per cent.
Anise Seed, Russian (*Pimpinella Anisum*).—2·8 per ct.
" " Thuringian (*Ditto*).—2·4 per cent.
" " Moravian (*Dttto*).—2·6 per cent.
" " Chili (*Ditto*).—2·4 per cent.
" " Spanish (*Ditto*).—3 per cent.
" " Levantine (*Ditto*).—1·3 per cent.
Arnica Flowers (*Arnica montana*).—0·04 per cent.
Arnica Root (*Ditto*).—1·1 per cent.
Asafœtida (*Ferula Asafœtida*).—3·25 per cent.
Asarum Root (*Asarum Europæum*).—1·1 per cent.
Basilicum Herb, fresh (*Ocymum Basilicum*).—0·04 p. c.
Bayberry Leaves (*Pimenta acris*).—2·3 to 2·6 per cent.
Bearberry (*Arctostaphylos Uva-Ursi*).—0·01 per cent.
Betel Leaves (*Piper Betle*).—0·55 per cent.
Birch Tar (*Betula alba*).—20 per cent.
Buchu Leaves (*Barosma crenulata*).—2·6 per cent.
Calamus Root (*Acorus Calamus*).—2·8 per cent.
Canella (*Canella alba*).—1 per cent.
Caraway Seed, Cult. German (*Carum Carvi*).—4 p. c.
" " Cult. Dutch (*Ditto*).—5·5 per cent.
" " Cult. East Prussian (*Ditto*).—5 p. c.
" " Cult. Moravian (*Ditto*).—5 per cent.
" " Wild German (*Ditto*).—6 to 7 per cent.
" " Wild Norwegian (*Ditto*).—6 to 6·5 p. c.
" " Wild Russian (*Ditto*).—3 per cent.
Cardamoms, Ceylon (*Elettaria Cardamomum*).—4-6 p. c.
" Madras (*Ditto*).—5 per cent.
" Malabar (*Ditto*).—4·25 per cent.
" Siam (*Ditto*).—4·3 per cent.
Carrot Seed (*Daucus carota*).—1·65 per cent.
Cascarilla Bark (*Croton Eluteria*).—1·75 per cent.
Cassia Flowers (*Cinnamomum Cassia*).—1·35 per cent.
Cassia lignea (*Ditto*).—1·5 per cent.
Cedar Wood (*Juniperum Virginianum*).—3·5 per cent.
Celery Herb (*Apium gravcolens*).—0·2 per cent.
Celery Seed (*Ditto*).—3 per cent.
Celtic Nard Root (*Valeriana celtica*).—1 per cent.
Chamomiles, Ger. (*Matricaria Chamomilla*).—0·285 p. c.
" Roman (*Anthemis nobilis*).—0·7 to 1 p. c.
Chekan Leaves (*Myrtus Chekan*).—1 per cent.
Cinnamon, Ceylon (*Cinnam. zeylanicum*).—0·9-1·25 p. c.
Cloves, Amboyna (*Caryophyllus aromaticus*).— 19 p. c.
" Bourbon (*Ditto*).—18 per cent.
" Zanzibar (*Ditto*).—17·5 per cent.
Clove Root (*Geum urbanum*).—0·04 per cent.
Clove Stalks (*Ditto*) —6 per cent.
Copaiba Balsam, Para (*Copaifera officinalis*).—45 p. c.
" " E. I. (*Dipterocarpus turbinatus*).—65 p. c.
Coriander Seed, Thur. (*Coriandrum sativum*).—0·8 p. c.
" " Russian (*Ditto*).—0·9 per cent.
" " Dutch (*Ditto*).—0·6 per cent.
" " East Indian (*Ditto*).—0·15 per cent.
" " Italian (*Ditto*).—0·7 per cent.
" " Mogador (*Ditto*).—0·6 per cent.
Cubebs (*Piper Cubeba*).—12 to 16 per cent.
Culilawan Bark (*Laurus Culilawan*).—3·4 per cent.
Cumin Seed, Mogador (*Cuminum Cyminum*).—3 p. c.

* Abstracted from the October Report of Messrs. Schimmel and Co., of Leipzic.

Cumin Seed, Maltese (*Ditto*).—3·9 per cent.
„ „ Syrian (*Ditto*).—4·2 per cent.
„ „ East Indian (*Ditto*).—2·25 per cent.
Curcuma Root (*Curcuma longa*).—5 2 per cent.
Dill Seed, German (*Anethum graveolens*).—3·8 p. c.
„ „ Russian (*Ditto*).—4 per cent.
„ „ East Indian (*Anethum Sowa*).—2 per cent.
Elder Flowers (*Sambucus nigra*).—0·025 per cent.
Elecampane Root (*Inula Helenium*).—0·6 per cent.
Elemi Resin (*Icica Abilo*).—17 per cent.
Eucalyptus Leaves, dried (*Eucalyptus globulus*).—3 p. c.
Fennel Seed, Saxon (*Anethum Fœniculum*).—5-5·6 p. c.
„ „ Galician (*Ditto*).—6 per cent.
„ „ E. I. (*Fœniculum Panmorium*).—2·2 p. c.
Galanga Root (*Alpinia Galanga*).—0·75 per cent.
Galbanum Resin (*Galbanum officinale*).—6·5 per cent.
Ginger, African (*Zingiber officinalis*).—2·6 per cent.
„ Bengal (*Ditto*).—2 per cent.
„ Japanese (*Ditto*).—1·8 per cent.
„ Cochin China (*Ditto*).—1 9 per cent.
Heracleum Seeds (*Heracleum Sphondylium*).—1 p. c.
Hop Flowers (*Humulus Lupulus*).—0·7 per cent.
Hyssop Herb (*Hyssopa officinalis*).—0·4 per cent.
Iris Root (*Iris Florentina*).—0·2 per cent.
Iva Herb (*Iva moschata*).—0·4 per cent.
Juniper Berries, Ger. (*Junip. communis*).—0·5 to 0·7 p.c.
„ „ Hungarian (*Ditto*).—1 to 1·1 per cent.
„ „ Italian (*Ditto*) —1·1 to 1·2 per cent.
Laurel Berries (*Laurus nobilis*).—1 per cent.
Laurel Berries Calif. (*Oreodaphne Californica*).—7·6 p.c.
Laurel Leaves (*Ditto*).—2·4 per cent.
Lavender Flowers, German (*Lavandula vera*).—2·9 p. c.
Ledum (*Ledum palustre*).—0·35 per cent.
Lignaloe Wood (*Elaphrium graveolens*).—5 per cent.
Lovage Root (*Levisticum officinale*).—0 6 per cent.
Lupulin (*Humulus Lupulus*).—2·25 per cent.
Mace (*Myristica moschata*).—11 to 16 per cent.
Marjoram Herb, fresh (*Origan. Majorana*).—0·35 p. c.
„ „ dried (*Ditto*).—0·9 per cent.
Masterwort (*Imperatoria Ostruthium*).—0·8 per cent.
Matico Leaves (*Piper angustifolium*).—2·4 per cent.
Matricaria Herb (*Matricaria Parthenium*).—0·03 p. c.
Melissa Herb (*Melissa officinalis*).—0·1 per cent.
Michelia Bark (*Michelia Nilagirica*).—0·3 per cent.
Milfoil Herb (*Achillea Millefolium*).—0·8 per cent.
Musk Seed (*Hibiscus Abelmoschus*).—0·2 per cent.
Mustard Seed, Dutch (*Sinapis nigra*).—0·85 per cent.
„ „ East Indian (*Ditto*).—0·59 per cent.
„ „ German (*Ditto*).—0·75 per cent.
„ „ Russian (*Sinapis juncea*).—0·5 per cent.
Myrrh (*Balsamodendron Myrrha*).—2·5 to 6·5 per cent.
Nigella Seeds (*Nigella Sativa*).—0·3 per cent.
Nutmegs (*Myristica moschata*).—8 to 10 per cent.
Olibanum Resin (*Olibanus thurifera*).—6·3 per cent.
Opoponax Resin (*Pastinaca Opoponax*).—6·5 per cent.
Parsley Herb (*Apium Petroselinum*).—0·3 per cent.
Parsley Seed (*Ditto*).—3 per cent.
Parsnip Seed (*Pastinaca sativa*) —2·4 per cent.
Patchouli Herb (*Pogostemon Patchouli*).—1·5 to 4 p. c.
Peach Kernels (*Amygdalus Persica*).—0·8 to 1 per cent.
Pepper, Black (*Piper nigrum*).—2·2 per cent.
Peppermint, fresh (*Mentha piperita*).—0·3 per cent
„ dried (*Ditto*).—1 to 1·25 per cent.
Peru Balsam (*Myroxylon Pereiræ*).—0·4 per cent.
Pestwort (*Tussilago Petasites*).—0·056 per cent.
Pimento (*Myrtus Pimenta*).—3·5 per cent.
Pimpinella Root (*Pimpinella Saxifraga*).—0·025 p. c.
Poplar Buds (*Populus nigra*).—0·5 per cent.
Rhodium (*Convolvulus Scoparia*).—0·04 per cent.
Rose Flowers, fresh (*Rosa centifolia*).—0·05 per cent.
Rue Herb (*Ruta graveolens*).—0·18 per cent.
Sage Herb, German (*Salvia officinalis*) —1·4 per cent.
„ „ Italian (*Ditto*).—1·7 per cent.
Sandal wood, East Indian (*Santalum album*).—4·5 p.c.
„ „ Macassar (*Ditto*).—2·5 per cent.
„ „ West Indian (*Unknown*).—2·7 per cent.
Sassafras Wood (*Laurus Sassafras*).—2·6 per cent.
Savin Herb (*Juniperus Sabina*).—3·75 per cent.
Snake root, Canad. (*Asarum canadense*).—2·8 to 3·25 p. c.
„ „ Virgin. (*Aristolochia Serpentaria*).—2 p. c.
Southernwood Herb (*Artemisia Abrotanum*). - 0·04 p. c.
Southernwood Root (*Ditto*).—0·1 per cent.
Spearmint (*Mentha crispa*).—1 per cent.
Star Anise, Chinese (*Illicium anisatum*).—5 per cent.
„ „ Japanese (*Illicium religiosum*).—1 per cent.
Storax (*Liquidambar orientalis*).—1 per cent.
Sumbul Root (*Ferula Sumbul*).—0·3 per cent.
Tansy Herb (*Tanacetum vulgare*).—0·15 per cent.
Thyme, Wild (*Thymus Serpyllum*).—0·2 per cent.
Valerian Root, Germ. (*Valeriana officinalis*).—0·95 p. c.
„ „ Dutch (*Ditto*).—1 per cent.
„ „ Japanese (*Patrinia scabiosæfolia*).
Vetiver Root (*Andropogon muricatus*).—0·2 to 3·5 p.c.
Water Fennel Seed (*Phyllandrium aquatica*) —1·3 p.c.
Wormseed (*Artemisia maritima*).—2 per cent.
Wormwood Herb (*Artemisia Absinthium*).—0·3-0·4 p. c.
Zedoary Root (*Curcuma Zedoaria*).—1·3 per cent.

PREPARATIONS OF DIGITALIS.*

Why are preparations of digitalis frequently inert?—Kobert, of Dorpat, answers this question as follows in an article reporting a number of experiments upon digitalis:† "What form of digitalis shall be employed? Most commonly preferred is the infusion. This naturally contains only those substances soluble in water. Of the three important active principles digitalein, a drug which produces dilatation of the vessels of the kidneys, is soluble in alcohol, it is contained in the tincture and alcoholic extract. The other constituents, digitoxin and digitalin, are also soluble in alcohol; in alcoholic preparations, as well as in the leaves themselves, we obtain the three important active principles. In fluid extracts digitoxin is precipitated as an insoluble powder. Acetum digitalis (vinegar of digitalis) approaches the infusion most closely in regard to its contents. It is very desirable that fresh, well-dried leaves be used. When the leaves are imperfectly dried, a species of fermentation may occur which may decompose the three essential components of the drug, for digitalin and digitalein are, like all glucosides, decomposable through foreign matter and fermentation. Digitoxin is, however, not a glucoside, but decomposes as easily and under the same circumstances as the others. The result of the decomposition of digitalis is not a substance producing the desired effects upon the heart, but a resin, digitaliresin (from digitalein and digitalin) and toxiresin (from digitoxin). The effect of these bodies is a violent irritation of the convulsive centres of the brain; severe convulsions may also occur, as in poisoning with picrotoxin or *Cicuta virosa*. Whenever the usual effects of digitalis are wanting, or instead cramps occur, we are safe in thinking that the preparation used was a poor one. The decomposition of digitalis may occur not only in the leaves, but also in infusions and solutions of digitalin and digitalein. As Tardieu says, 'The pure digitalein when suspended in water or dissolved, undergoes decomposition in a short time, whereby the bitter taste is altered, and, as an indication of a radical change in the constitution of the drug, gases form.' Among my patients I have very often seen decomposition in preparations of digitalis which had stood two days in a room. This happens from the mixing of digitalis tincture with syrup or watery solution. The practice prevalent in America of not preparing the drug from the leaves when desired, but of using a concentrated infusion, explains the frequent disappointment in its use."

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* From the *American Journal of Pharmacy*, September.
† *Therapeutic Gazette*, June 15; *Medical News*, July 23, 1887.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 29, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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CONDITIONS AFFECTING THE FUTURE OF PHARMACY.

IN considering the conditions which now obtain in regard to the practice of pharmacy in this country, it is evident from very cursory observation that there are two directions in which development is taking place in a way that must have a material influence in the future. On the one hand, the increase of competition in the sale of articles which have hitherto been almost entirely in the hands of chemists and druggists may be expected to lead to one or other of two alternative results, either that portion of the chemist and druggist's business will have to be, to a great extent, abandoned, or, if it is to be retained, that can only be done by meeting competition upon the same lines as general traders succeed in carrying on their business. Such a development must necessarily tend to destroy the semi-professional status which it is desirable for the pharmacist to attain or to maintain, and at the same time it must also have the effect of merging those who adopt this course more completely with general traders who require for the conduct of their business no special technical education and training. If, on the other hand, those various branches of business which have hitherto been carried on by chemists and druggists as accessory to the practice of pharmacy were to be generally discarded by them, the result of such a proceeding must be such a diminution of the prospect of profitable occupation, that there would not be a possibility of more than a small proportion of those now engaged in business continuing it upon a remunerative basis. This view of the present position of affairs, and of their probable tendency, seems to point to the necessity, which has more than once been mentioned in this Journal, of a separation of the trade into two classes, the one comprising those whose business really partakes little, if at all, of the pharmaceutical character, and the other being limited to those who intend to confine themselves to pharmacy proper, and rely upon their qualifications for the efficient practice of that art as constituting a sound basis for their claim to be considered as something more than mere vendors of goods.

It is a fact that cannot be ignored by those who take a keen interest in the welfare of pharmacy, and in its future advancement as a calling, that the business carried on by many of those who possess what is now received as a pharmaceutical qualification is scarcely, if at all, of such a nature as to demand any qualification of the kind that it is intended to be. Apart from the mere sale of poisons there are few transactions carried out in such a business as is now referred to that might not perhaps be conducted without any risk to the public by any grocer's apprentice or assistant. In such cases the dispensing of medicine is a thing that is seldom required to be done, and the bulk of the business transacted consists in the mere vending of goods, for which even the present pharmaceutical qualification is not essential. If it be necessary to offer reasons for the opinions here expressed, such may be found in the records of the various examinations held under the Pharmacy Act of 1868. Taking in the first place the Preliminary examination, which is of such a nature that with the exception of the one subject of Latin, any schoolboy ought to be able to pass it creditably, the report of the College of Preceptors, published in the present number, presents a most lamentable indication of the want of fitness in those who offer themselves as candidates. This examination has just been carried out at thirty-seven centres throughout the country; 290 candidates were examined, and out of that number only 151 were able to satisfy the examiners. A further examination of the details of failure throws an even more sad light upon the matter. The subjects of examination are Latin, English and Arithmetic, and of those who failed 22 failed in all three, 54 in two subjects, and 56 in one subject. The majority of the failures were not in Latin, as might perhaps have been expected, but in English and Arithmetic, and of the 48 candidates who failed in English, 22 did so on account of incorrect spelling.

These facts show unmistakably that there is a serious deficiency of any just appreciation of the educational preparation requisite in those who select, or are put to the practice, of pharmacy as a calling by which they are to earn their living. And, when at a later period those who pass the Preliminary examination present themselves to obtain qualification as pharmacists, there are too many instances in which it appears that those who have passed the Preliminary examination are in reality more unfortunate than those who failed to do so. Again, there is the same evidence of want of appreciation of what is requisite, and with it evidence of the absence of any technical training of the kind which would enable the candidate to perform the duties appertaining to the practice of pharmacy. With these facts so continually recurring, and in the absence of any adequate provision to ensure for each aspirant to pharmaceutical qualification a thorough educational training, it especially behoves those who

desire to advance pharmacy to a more satisfactorily recognized position to take every opportunity of aiding in the furtherance of the objects for which the Pharmaceutical Society was founded. At present it is only by means of voluntary action on the part of a minority that there is a prospect of this being done. The attempt to establish a system of education has failed for the time being, and partly, no doubt, by reason of the circumstances above referred to as affecting a large portion of the trade. Better results in this direction can only be hoped for for the present; but true pharmacists who rightly esteem their position, and correctly estimate their obligation to support the Society in the advancement of their calling, will at least find some consolation and encouragement in the fact that another step is now about to be taken in strict conformity with the objects set forth in the Charter, one which, though somewhat long deferred, bids fair to be productive of great benefit in promoting development in that direction which pharmacy proper has so much need of.

Mr. E. A. Andrews, writing from the North West London Hospital, calls attention to a circumstance he has observed in dispensing a prescription ordering sodium salicylate with tincture of iodine and sodium bicarbonate. On adding the tincture of iodine to a solution of the first-named ingredient the mixture soon became colourless, and on experimenting with tincture of iodine and sodium salicylate he found that a considerable quantity of tincture of iodine was decolorized when added in successive portions to a solution of sodium salicylate. Reference is made to this fact, because it has been stated that tincture of iodine is again coming into use for gout and rheumatism, and it is therefore probable that prescriptions similar to the one mentioned may be more frequently met with. As regards the decoloration of the tincture of iodine which occasioned Mr. Andrews some surprise, it was probably not due, as he supposed, merely to a formation of sodium iodide, by which part of the salicylic acid was also liberated, but in reality to the formation of an iodosalicylic acid by the substitution of iodine for part of the hydrogen in salicylic acid. Three compounds of this kind are known, and they appear to be readily formed by the reaction of iodine with salicylic acid in the presence of a base, half of the iodine being converted into iodide, while the other half is substituted for an equivalent proportion of the hydrogen of the salicylic acid.

* * *

We notice in several recent publications relating to the toluene derivative which has been suggested as a substitute in some cases for sugar on account of its remarkable sweetness, that the name applied to it by the discoverer is spelt with a final e. This appears to be inexpedient when it is remembered that the term saccharine has been for several years in common use as representing the fermentable sugar used by brewers. In view of this fact it would be more appropriate to make use of the word "saccharin" to represent Fahlberg's new material, and thus in some degree to avoid the possibility of confusion and misconception resulting from the application of the same name to two entirely distinct things.

* * *

The subject of medical co-operation was recently discussed at a meeting of delegates from co-operative societies in the Rochdale district, and as a result it appeared that the general feeling was opposed to the establishment of medical institutions in connection with co-operative societies, but that it was thought drug dispensaries attached to the societies' establishments might prove beneficial.

* * *

The *Canadian Pharmaceutical Journal* reports the occurrence of two deaths in the neighbourhood of Hamilton, apparently through the substitution of morphine for quinine. The victims were two children, who were suffering from malaria, for the cure of which the medical man in attendance provided six powders. After the administration of one powder to each of the children, however, both showed signs of being under the influence of a narcotic, and in spite of every effort they died in a few hours. The medical man is reported to have said that the powders had been made up with morphine that had been supplied to him from a drug store as quinine.

* * *

According to the *Pharmaceutical Record* the Colleges of Pharmacy in the United States are as a rule commencing the new session with larger classes than ever before. The senior class of the New York College of Pharmacy at the time of writing already numbered 132, and the junior class exceeded that of last year.

* * *

The current number of the *Pharmaceutical Era* supplies a good illustration of the necessity for caution in receiving the unchecked statements of volunteer and irresponsible reporters on the quality of commercial articles, which are not always flattering to the unfortunate manufacturers implicated. In this case various samples of citrate of iron and quinine were reported upon adversely; but it now appears that one important firm that was charged with sending out scales deficient in quinine does not include citrate of iron and quinine in its price-lists, and has never manufactured any.

* * *

On Thursday next, Mr. G. E. Perry, the newly elected President of the Midland Counties Chemists' Association, will deliver the inaugural address on the opening of the session at the Grand Hotel, Colmore Row, Birmingham. The chair will be taken at eight o'clock.

* * *

The first meeting of the Chemical Society for the present session will be held on Thursday next, November 3, at 8 p.m., when the following papers are to be read:—"Note on the Atomic Weight of Gold," by Professor Thorpe and A. P. Laurie; "The Interaction of Zinc and Sulphuric Acid," by M. M. Pattison Muir and R. H. Adie; "A Note on Safety Taps," by W. A. Shenstone; "Note on Guthrie's Compound of Amylene with Nitric Peroxide," by Dr. A. K. Miller; "The Dehydration of Metallic Hydroxides by Heat, with special reference to the Polymerisation of the Oxides and to the Periodic Law," by Dr. Carnelley and Dr. J. Walker.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

October 18, 19, 20 *and* 21, 1887.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 19th, 20th and 21st on behalf of the Privy Council.

MINOR EXAMINATION.

18*th.*—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ardern, John William .....Ashton-under-Lyne.
Bakes, Fred .....Bradford.
Beanland, John Milner .....Keighley.
Carswell, Thomas Retson .....Paisley.
Cartwright, Benjamin.....Glasgow.
Gillanders, James.....Aberdeen.

19*th.*—*Eleven* candidates were examined. *Three* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dick, David Laing .....Falkirk.
Edmondson, Thomas .....Cockermouth.
Farmer, John .....Glasgow.
Fisher, William .....Dundee.
Gaddes, William .....Brampton.
Graham, David.....Glasgow.
Harwood, Benjamin Hobart ..Manchester.
Hislop, James Andrew .....Hawick.

20*th.*—*Thirteen* candidates were examined. *Nine* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Kerr, George Jobling .....Liverpool.
Maddock, Herbert .....Manchester.
Matthew, John Ewen .....Fraserburgh.
Robinson, Thomas .....Wigton.

21*st.*—*Twelve* candidates were examined. *Five* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Simpson, Peter.....Rothes.
Stevenson, Robert .....Edinburgh.
Whiteley, John William.....Gainsborough.
Wilkinson, Frank Herbert.....Tranmere.
Wilson, Alexander .....Greenock.
Wilson, Robert Wade .....Manchester.
Wright, David Morgan .....Kirkcaldy.

EXAMINATIONS IN LONDON.

October 19, 20, 21, 26 *and* 27, 1887.

Present on each day—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

MAJOR EXAMINATION.

19*th.*—*Nine* candidates were examined. *Five* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Carter, Harry Lansdale .....London.
Collett, William James .....Nantwich.
Miner, Major Thomas.....Walsall.
Williams, Joshua Edward .....Bryn Glas.

MINOR EXAMINATION.

19*th.*—*Twenty-two* candidates were examined. *Nine* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Arnold, Walter .....Wolverhampton.
Bainbridge, John.....Kirkby Stephen.
Banyard, John Albert..... Anerley.
Barber, Daniel Stone .....Dursley.
Barker, Robert Henry.....Ambleside.
Bennet, Andrew Russell.....Uphall.
Billington, Herbert Bennett ...Barnsley.
Bird, John.....Manchester.
Birkett, George.....Morecambe.
Blewett, William Thomas .....Penzance.
Boole, Lucy Everest.....London.
Brown, Harry Walter.....London.
White, Edmund .....Rochester.

20*th.*—*Thirty* candidates were examined. *Seventeen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Clarkson, Thomas Edward.....Wibsey.
Coley, Robert .....Melton Mowbray.
Cotton, James Charles .....St. Helens.
Downes, William Francis .....Wilmslow.
Dunn, Edward Bertram .....London.
Ebbage, Henry Edward .....Halesworth.
Evans, Frederic Ernest .....Lymm.
Everett, John Garwood .....Ipswich.
Fardon, Arthur Edwin..... ...Bristol.
Forster, James Beaty .....Carlisle.
Fresson, Alfred Reginald .....Stevenage.
Gale, William Gillam .....Worksop.
Gibson, Matthew Henry.....Matlock Bath.

21*st.*—*Twenty-eight* candidates were examined. *Fourteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dunn, John Henry .....Hull.
Golden, Alfred Percival.....Leicester.
Golds, Lewis George .....Steyning.
Hall, Arthur William .....Sunderland
Hart, Frank .....Bolton.
Heald, Alfred Francis.....Burnham
Heap, Alfred.....Kendal.
Hoare, William Richard.....Cheltenham.
Horne, George Herbert .....Scarborough.
Hutchin, Llewellyn A. James...Saffron Walden.
Jennings, John Atkinson .....Natland.
Jessop, Sam .....Brighouse.
Kent, William Hy. Plaisted ...East Molesey.
Langton, William Crowder ..Epworth.

26*th.*—*Thirty* candidates were examined. *Thirteen* failed. The undermentioned *seventeen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Evans, Robert Frederick .....Manchester.
Hall, Sydney Charles .....Newark.
Harrison, George William .....Reading.
Ingle, George .....Bradford.
Jones, Edwin Pryce .....Aberdare.
Leat, Frederick Charles .....Ringwood.
Leech, John Frederick .....Tideswell.
Limbrick, James Alfred.....London.
Lyon, Walter Henry .....Chatteris.
Matthews, John George .....Douglas.
Newbould, Victor Emanuel ...Sutton.
Parish, Alfred James .....Kidderminster.
Parker, John Henry .....London.
Phillips, Daniel..... .....London.
Polack, Emanuel .....Rochester.
Smith, Arthur ....Watford.
White, Thomas Arthur .....Basingstoke.

27*th.*—*Twenty-eight* candidates were examined. *Sixteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Crompton, John Clayton .....Manchester.
Hickmott, Albert Ernest .....London.
Plumbly, Walter .....Norwood.
Rees, William .....Pontardawe.
Robins, Henry ....Wantage.
Thorne, Henry Courtenay .....Taunton.

Tree, Frederick ..... St. Leonards.
Vawser, Arthur .....March.
Wallbridge, John George .....Liverpool.
White, Edward .....Bristol.
Wilkinson, Charles Edward ..Bridgnorth.
Wycherley, Arthur Lincoln ...Whitchurch.

PRELIMINARY EXAMINATION.

27th.—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Blanchford, Reginald Arthur...Sutton.
Brittan, Thomas Bennett ... ..King's Lynn.
Brookes, George Henry .....Llandudno.
Brown, William Herbert .....Edinburgh.
Coupland, William Finlay .....Harrogate.
Dixon, Henry Benjamin.....Whitehaven.
Evans, Herbert Charles .....Lowestoft.
Evason, Charles Edward.....Stourbridge.
Forster, George Francis .....Dover.
Frowde, John James .....Douglas.
Jones, Walter Herbert .....Aberdare.
Robb, Helen.....Portsoy.
Seed, Thomas Henry .....London.
Smith, Sidney Frederick.....Strood.
Vogt, George .....Kendal.
Warren, Ernest Downing .....Chatham.
Wintle, John Henry .....Severn Stoke.
York, Frank.....Richmond.

The report of the College of Preceptors on the examination held on October 11 was received.

Two hundred and ninety candidates had presented themselves, of whom *one hundred and thirty-nine* had failed. The following *one hundred and fifty-one* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Ambler, John Richardson .....Birkenhead.
Amiss, Albert Edward .....London.
Anderson, Robert.. .....Old Meldrum.
Angus, Robert Smith .....Dunbar.
Anning, James John .....Leeds.
Bailey, William Henry .....Northwich.
Baker, John .....London.
Banks, Charles Henry.....Wolverhampton.
Bateson, James Malcolm .....Gargrave.
Baxter, Edward .....Worksop.
Bayfield, John Blyth .....Great Yarmouth.
Beath, Andrew.....Dollar.
Bell, Arthur George Russell ...Kettering.
Bell, James Thomas .....Accrington.
Bennallack, William John .....Tregoney.
Boiston, James.....Harrogate.
Boucher, John Mycroft .....Bristol.
Bowie, William .....Glasgow.
Brown, John... .....Glasgow.
Brown, Thomas Warren.....Uppingham.
Bryce, James .....Laurieston.
Campkin, Thomas Stoughton...London.
Cantle, Herbert .....Cardiff.
Carmichael, Matthew .....Glasgow.
Chambers, William Banks.....Lincoln.
Charles, David.....Llanelly.
Charnock, John .....Preston.
Clarke, Edward Percy .....Nottingham.
Clay, Joseph Henry ....Nuneaton.
Cooper, Frederick ..... Ticehurst.
Coote, Edward William .....Bildeston.
Cox, Harry Bertrand .....Shepton Mallet.
Crouch, William Samuel .....Epsom.
Currie, John .....Glasgow.
Curtis, George Frederick .....Wellingborough.
Cuthbert, Ernest .....Lancaster.
Daniel, William James ....Marske-by-the-Sea.
Davey, Henry Augustus.....Spilsby.
Davies, John Bridge .....Abergele.
Davies, John Osborne .....Llanfyllin.
Davies, Joseph .....Birmingham.
Dunn, Henry Benjamin .....Gainsborough.
Edsell, James Arthur .....London.
Edwards, Samuel.....Godalming.
Eldred, Charles William.....Shrewsbury.
Ellis, William Frederick.....London.
Evans, William Maurice.....Narberth.
Fisher, Edwin Arthur.....London..
Fletcher, William Henry .....Spilsby.
Forshaw, Louis Gerald .....Oxford.
Foster, Henry Charles Thomas Oxford.
Fox, Horace Tingle.....Sheffield.
Franklin, John Henry .....Manchester.
Freeland, John.....Bathgate.
German, Charles McKenzie ...Kendal.
Gibson, Robert Roxburgh .....Newcastle-on-Tyne.
Goodall, Horatio Charles .....Lincoln.
Green, Reginald .....Gateshead-on-Tyne.
Green, Samuel Marston .....London.
Greenhalgh, Clifton.....Harrogate.
Hankinson, William .....Stockport.
Hay, William Fowlie .. ..Aberdeen.
Healey, William Frederick.....London.
Heppenstall, Percy .....Hull.
Herman, Robert Charles.....Liverpool.
Hesketh, Henry Cambridge ...Southport.
Hodgetts, Walter Best .....Pedmore.
Holt, John Winn.....Hull.
Hosking, Hugh Livingstone ..Rochester.
Hughes, John Henry .....Festiniog.
Jones, David Barett.....Llanstephan.
Jones, Dora Ann C..... London.
Jones, Henry Gladstone .....Aberystwith.
Jones, Lewis Morris .....Holyhead.
Joseph, Leopold .....Cardiff.
Kennard, John.....Denbigh.
Kenway, Ivor ....Neath.
Kidd, Andrew .....Dundee.
Kinton, Walter Gregory.....Leicester.
Latreille, Albert .....London.
Lee, Arthur William .....Winchester.
Lee, James Arthur Richard ...Mexborough.
Long, Fred. James Towell.....Dover.
McGregor, William John .....Ellon.
Martin, Walter Edwin .....Beccles.
Mead, Elisha Preston .....Whitby.
Moodie, James Hamilton .....Wells, Norfolk.
Moody, Edgar ....Mansfield.
Moses, Henry Chadwick .....Northwich.
Mould, Francis Hopper ... .Newcastle-on-Tyne.
Myer, Abraham Joseph Alexr...London.
Newman, Ernest Harry .....Totnes.
Newton, Thomas Frederick ...Hebburn Colliery.
Nicol, James..... .....Fordoun.
Noble, John Geo. Barrington...South Shields.
Norrish, Herbert .....Exeter.
Nott, Charles Trevor Freds. ...Great Stanmore.
Ogilvie, William .....Peebles.
Oldfield, Alexander.....London.
Owen, Evan Thomas ....Conwil.
Owen, William John .....Holyhead.
Page, Sydney Richard... .....Aberavon.
Pattinson, Joseph .....Wigton.
Peberdy, Arthur James .....Leicester.
Poole, Henry Gibson .....London.
Purdie, William Alexander ...Loanhead.
Ramshaw, Pollard .....Sunderland.
Read, William Miles .....Milnthorpe.
Reckless, Walter, Junr. .....Sheffield.
Reoch, Alexander Thompson...Dundee.
Rhodes, Edwin Atkinson .....Wakefield
Rogerson, Joseph.....Rugby.
Rossiter, Robert Tapley .....Paignton.
Russell, James Anderson .....Glasgow.
Samuel, David ....Llanelly.

Sayers, Arthur Hubert .....Chichester.
Schuller, Walter Joseph .....London.
Schuhmacher, Henry .....Liverpool.
Sellers, John Howard .....London.
Shaw, John Thomas .....Nottingham.
Sherwood, Joseph Henry .....Withington.
Shields, William Thomas .....Stoke-on-Trent.
Simmons, Alfred William .....King's Heath.
Slater, Edward.....Winchester.
Slidders, John ....Maryport.
Smith, Arthur Charles .....Buckingham.
Stanton, Frank Leonard.....Bridgnorth.
Taylor, Alice Jane .....London.
Thomas, John Aubrey.....Redditch.
Thomas, Owen ....Llandyssul.
Thompson, Edgar Joseph .....Birmingham.
Thompson, John Cooke .....Tunstall.
Tocher, Robert.....Peterhead.
Varlow, Joseph William.....North Shields.
Waddington, Isabel.....Thornton.
Waite, Herbert Shuttleworth...Bradford.
Ward, John ..... Bishops Castle.
Warren, Spencer .....Leek.
Waters, David Sandison.....Wick.
Watkins, Henry Baskeville ...Darlington.
Watkinson, Harold Arthur.....Farnworth.
Wells, Frederick Geo. Rising...Norwich.
Whitfield, Arthur Charles .....Wisbech.
Wilcock, William Howard.....Penzance.
Williams, Ernest.....Falmouth.
Williams, Thomas Jones.....Denbigh.
Williamson, Frederick Arthur..Ashton-on-Ribble.
Wood, Robert Jos. Askey .....Loughborough.
Wycherley, Thomas Francis ...Lutterworth.
Wykes, William Henry .....Shipston-on-Stour.
Yeats, William .....Aberdeen.

The questions set for this examination were printed in the *Pharmaceutical Journal* for October 22, p. 347.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	15	6	9	Lancaster	7	5	2
Birmingham	15	8	7	Leeds	14	7	7
Brighton	4	4	0	Lincoln	7	5	2
Bristol	4	2	2	Liverpool	17	9	8
Cambridge	2	1	1	London	42	19	23
Canterbury	2	1	1	Manchester	17	9	8
Cardiff	7	4	3	Newcastle	12	7	5
Carlisle	8	2	6	Northampton	4	3	1
Carmarthen	10	7	3	Norwich	4	4	0
Carnarvon	7	2	5	Nottingham	12	6	6
Cheltenham	2	0	2	Oxford	5	3	2
Darlington	2	2	0	Peterborough	4	2	2
Dundee	4	2	2	Sheffield	4	4	0
Edinburgh	16	6	10	Shrewsbury	6	4	2
Exeter	7	3	4	Southampton	3	2	1
Glasgow	12	6	6	Truro	4	3	1
Hull	6	2	4	Worcester	1	0	1
Inverness	1	0	1	York	2	1	1
Jersey	1	0	1				

The following particulars respecting this examination have been supplied by the College of Preceptors :—

Of the 290 candidates, examined at thirty-seven centres, 151 passed and 139 failed.

In Latin 275 candidates took Cæsar and only 15 Virgil.

Of the 139 candidates who failed,

56 failed in one subject only ;
54 „ „ two subjects ;
22 „ „ three subjects ;
7 obtained the required marks in each subject, but failed to secure the pass aggregate.

Of those who failed in *one* subject only,

15 failed in Latin ;
28 „ „ Arithmetic ;
13 „ „ English ;

Of those who failed in *two* subjects,

19 failed in Latin and Arithmetic ;
8 „ „ Latin and English ;
27 „ „ Arithmetic and English ;

Of the 48 candidates who failed in English 22 are attributed to bad spelling.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The second general meeting of this session was held at 103, Great Russell Street, W.C., on Thursday, October 20. Mr. T. S. Dymond, President, in the chair.

The minutes of the previous meeting having been read and confirmed, several new members were proposed.

A paper was read by Mr. E. G. Baker, F.L.S, entitled, "Recent Researches in Botany," which will be published in a future number.

In the discussion which followed, Messrs. Phillips, Vallance, Butterfield, Millard, Blackham, McDiarmid and the President took part.

Mr. Baker having replied to the various questions, the proceedings terminated.

On Thursday evening, the 27th inst., the third general meeting of the session was held. The chair was taken at 9 o'clock by the President, Mr. T. S. Dymond. There was a large attendance.

The following paper was read on—

The New Departure.

BY R. W. GILES.

There is no "finality" in human affairs—which is only a secular form of the saying, "there is no peace for the wicked." I have seen many epochs in the evolution of pharmacy, each of which seemed to promise to land us on that happy shore, where the unqualified cease from troubling, and where the duly diplomated pharmacist shall be at rest. Alas! the prospect is like the horizon, and recedes as we advance. Hope is the only birthright of mankind. As Pope said in one of those pregnant lines by which the memory of poets is kept green—

> Hope springs eternal in the human breast,
> Man never *is*, but always *to be* blessed.

Let us then learn to accept the inevitable law that perfection, completeness, finality are unattainable by man—so shall we not be disappointed. Let us continue to advance—so shall we not be deprived of the consolations of hope.

There is an ominous analogy between finality and stagnation, which should reconcile us to the conviction that we can never attain to finality. How dull this world would be if there was nothing more to be accomplished ; if, like Alexander, we should all be left weeping because there were no more difficulties to be overcome !

But whether the perfection, which is implied in the idea of finality, be attainable or not, we shall, doubtless, agree that it has not yet been attained ; least of all in the conditions and surroundings of pharmacy. Advancement is then our highest hope. Now advancement may be of two kinds. One is the steady progress along a path already marked out ; and this is comparatively easy ; it is like the smooth onward course of a bicycle—*solvitur ambulando*—the only difficulty is to stand still.

But this easy-going automatic progress will not go on for ever. The time inevitably comes when the road branches to right and left, and imposes upon us the obligation to review our position, to consider whither we

are going, and to determine which course tends to our ultimate destination. The choice commonly leads to what in the convenient slang of debate is called "a new departure;" and it seldom happens without some timid spirits exclaiming against the change, and prophesying disaster and ruin, if indeed they do not go further, and denounce it as apostacy from cardinal principles. But such change of direction is not necessarily a "new departure;" or even if it be it is not necessarily a surrender of principle. It may be inherent in the nature of things, so that there may be no choice between the so-called "new departure" and a halt; and if the halt is called our metaphorical bicycle must come to the ground.

We seem now to have arrived at such an epoch in that allegorical journey commonly known as "the progress of pharmacy," when the roads branch, and when we are called upon to decide which we shall follow. If we carry the metaphor a little farther we may picture to ourselves a finger-post pointing with outstretched arm in the direction of each of the now divided routes; and I think we should find one of these arms inscribed with the words "trades unionism," and the other with the words "scientific development." More or less these two paths have always loomed in front of the members and directors of the Pharmaceutical Society, and there have not been wanting those who would have tempted them to follow the seductive downward path of trades-unionism. Now it may be at once admitted that the Society took its origin from trades-unionism, from a combination whose immediate object was to repel an attack upon its trading privileges, and that it was first called into existence for purposes of trade protection. It would seem, therefore, that those who would continue to drive the pharmaceutical coach in that direction were adhering to the original objects of the Association; and that to follow the course of "scientific development" would really be a "new departure." This, however, is a superficial view of the case. Why were the trading interests of the pharmaceutical body assailed, and what steps did they from the first take to avert the threatened interference? It is an oft told tale, and it would be inexcusable to waste your time in repeating what everybody must be supposed to know. Suffice is to say that the attack, which threw the chemists and druggists into a panic in 1841, was not an attack upon trade privileges as such, but an attack upon the exercise of those privileges by incompetent persons. It was essentially a "protective" measure; and those who led the defence against a crude and precipitate mode of interference were wise enough to distinguish this characteristic; they were also wise enough to see that the principles upon which the attack rested were incontrovertible, and they were wise enough to regulate their system of defence by the spirit of the attack. "*Fas est ab hoste doceri*" was never more intelligently or more successfully applied than on this critical occasion—the last of a long series of attacks upon the independent existence of chemists and druggists. The policy of the Pharmaceutical Society from that day to this may be summed up in language travestied from a political model—Qualify! Qualify!! Qualify!!! and to continue in that course, adapting it to the circumstances of the hour, is no "new departure," although it may be attended with new manifestations.

The conflict between "trades-unionism" and "scientific development," the question whether the Pharmaceutical Society should direct its energies towards securing protection for its members, or whether it should pursue the broader path of scientific development, would therefore be more correctly stated thus: "Shall the Pharmaceutical Society seek (*inter alia*) to obtain protection for its members by advancing their scientific status, or by direct attempts to obtain further legislative privileges?" and I propose to amplify this inquiry by adding, "Is it desirable, in the promotion of scientific pharmacy, that the Society, in its corporate capacity, should now do something which hitherto, in its corporate capacity, it has not deemed it expedient to attempt?"

It must be understood when we talk of "protection" that we use the word in a very limited sense. If there be any here who hope for protection for pharmacists for their own benefit, or for any other reason, or in any other form than as it may be necessary for the public good, I earnestly advise such misguided persons to take a "new departure" out of this room, and to call on their way home at the nearest circulating library, where they can obtain a poetic version of 'The Pleasures of Hope,' for I assure them that such hopes as they appear to entertain will find no support in the dull prose of this address. As nobody has gone for his hat, I will now proceed:—

I really ought to apologise for this preliminary balderash. What does it matter whether the Society took a wise view of the future fifty years ago, except that if it had not done so it would not now be in existence? What does it matter whether any plan that may now be adopted is consistent with the intention of its founders? Worthy men! alas, we have more to fear from their ghosts, οἱ πολλοί as they are, than from their scanty remainders in the flesh. The question for us, and the only question is, what is the best to be done, at the present moment, guided by the experience, but not fettered by the precedents of the past? The same question proposed itself in 1841, and was judged upon the same basis, and I venture to say that whatever conclusions pharmacists of to-day may arrive at they will not be a greater departure from past traditions than was the policy—the wise policy—of the founders of the Pharmaceutical Society, guided by the enlightened judgment of Jacob Bell.

It may help us in our estimate of the merits of the two policies of "trades-unionism" and "scientific development" to compare the brief duration of those bodies which have identified themselves with the former with the permanence of the Pharmaceutical Society, testing the results by their relation to the doctrine of the survival of the fittest.

In the course of the early struggles of chemists and druggists against hostile legislation there were several associations strictly protective in character and ephemeral in duration, for nothing can be permanent which is founded solely upon negation. Although the Pharmaceutical Society originated in this manner, it coupled with the negative function of external resistance the active function of internal improvement, and no one can doubt that it has been entirely due to this last characteristic that the Society has retained its vitality and has continued to acquire stability and influence from that time to the present. It has not succeeded in satisfying the expectations of everybody; it has not been able to secure the support and co-operation of all, or even of the majority of the members of the body which collectively it represents. More is the pity. If the Society had been better supported it would no doubt have accomplished more. It has been constantly accused of neglecting the trade interests of the bulk of its members, and other associations have sprung into existence with the avowed object of supplying this deficiency. Where are they? One such association (the United Society of Chemists and Druggists) was formed in 1861, whether intentionally antagonistic to the Pharmaceutical Society or not, it is unnecessary to inquire. It certainly for a time divided the suffrages of the pharmaceutical body and impaired its influence outside. In proof of this I need only refer you to the collision between the Bills promoted in Parliament by each Society in the session of 1864, when both Bills were rejected. The United Society held the field of trades-unionism without a rival, as it was fond of asserting; but even so it could not keep alive, and it went the way which I think all associations are doomed to go which attempt the impossible task of founding a scientific vocation upon the avowed basis of self-interest. More recently, another association was formed (the Chemists

and Druggists' Trade Association) which kept more clear of the operations of the Pharmaceutical Society than did its predecessor, the predeceased. It concerned itself almost exclusively with trade questions : the prosecution of unqualified offenders against the Pharmacy Act, and the defence of its own members against excise prosecutions and prosecutions under the Sale of Food and Drugs Act, objects which, however good in themselves or in theory, are apt to degenerate into abuses in practice, and are calculated, on the one hand to produce a large amount of ill-feeling, on the other hand, to cause misunderstandings, and almost certainly to place such associations in antagonism with the Government departments, with whom it is desirable that the Pharmaceutical Society should maintain good relations. Once only has the Society done anything to prejudice these good relations ; that was when, most unhappily, a general meeting refused to fulfil their statutory obligations to prescribe regulations for keeping, dispensing and selling poisons in accordance with section 1 of the Pharmacy Act, 1868. This was a deplorable breach of faith, and must, I think, now be regretted by those who were chiefly responsible for it. There is no doubt that it damaged the credit of the Society with the Privy Council and with Parliament to an extent by which it has continued to suffer to the present day, and it may very probably be that the Society will never have the opportunity of regaining the position which it then forfeited. I should be sorry to see the Pharmaceutical Society identify itself avowedly with either of the *rôles* just mentioned. I do not want it to become a persecuting body, after the manner of the Society of Apothecaries of former times. I do not want it to hold a general retainer as the advocate of fishy evasions of the Stamp Acts, or questionable breaches of the law for ensuring the purity of drugs ; and it is pretty certain that the majority of these cases are not defended with altogether clean hands. The Society does occasionally interfere, and the caution which it generally observes enables it to interfere with better grace and better effect. This later Trade Association is also, I understand, defunct, and I think the collapse proves that it had no sufficient *raison d'être*, and is a good justification for the Pharmaceutical Society avoiding the same ground.

I may here, perhaps, be permitted to repeat what I said to your Association in an address on pharmaceutical politics in 1883, and have often said at other times and in other places, viz., "The (Pharmaceutical) Society is the only corporation which is empowered, or is ever likely to be empowered, to regulate the education and qualification of pharmacists, or, in other words, to uphold and exalt the standard and dignity of pharmacy. . . . Take heed, therefore, that you neither negligently, disloyally, nor wilfully detract from its high character ; for of this be sure, that if the Society fails there is none other power to which English pharmacy can look for rescue." I must ask your pardon for the egotism of thus repeating myself. My only apology is that this seeming truism appears to be strangely overlooked, and there seems to be in certain quarters (sometimes in high quarters) more readiness to discredit the Society than to take such a conservative interest in its administration as would uphold the character of its Executive, and strengthen their hands for patriotic, as distinguished from "popular," measures.

And now we shall naturally ask ourselves, how can the Society's influence be best extended ? How shall it most effectually carry on the work of advancing pharmacy, and securing for it that better recognition which would give it still greater power for good ? It is not only necessary to do the right thing, but to do the right thing at the right time, and therefore to do the most urgent thing first. The most urgent thing at the inauguration of the Society was undoubtedly the better qualification of its members. This duty has always been fully recognized and fairly fulfilled, not without some opposition from the quarters to which I have alluded. Probably, the greatest want now is extended rather than improved education ; but great difficulties have hitherto impeded the accomplishment of this desideratum. Most potent, though perhaps least apparent, of these obstacles is the absence of a proper recognition of the functions and of the status of pharmacy.

From this cause proceeds the unwillingness of young men to incur the expense and the inconvenience of a sufficient course of study to qualify them for their intended career. I need not pursue that topic. None can know better than yourselves, who are face to face with the dilemma, the incentives and the deterrents to such a course of study as should turn out an ideal pharmacist. I think that all who have gone through the schools have felt that they have left off just where a really solid scientific education, one which would enable them to walk alone in the path they are about to enter, ought to begin. And when I consider the enormous development that has taken place in organic chemistry since I was a student in Bloomsbury Square in 1848, a development which overshadows its earlier corpus—the ten months curriculum, which even then appeared insufficient, shrinks into still more insignificant dimensions.

I cannot help contrasting this scanty curriculum with the elaborate preparation which the alumni of other professions are content to pass through. Thus, for example, I have in my mind's eye a youth who is preparing for the profession of the bar, intending first to acquire a preliminary knowledge of science as an aid to the conduct of scientific cases. He has been trained with that object from childhood ; he has studied chemistry and physics systematically under the best teachers, and in practical laboratories for seven years, including three years almost exclusively devoted to it at one of our best reputed universities. He is now capable of and practically engaged in chemical research. Yet in this case chemistry is subordinate and accessory to the studies which his profession exacts. Whereas a pharmaceutical student grudges ten months given to the prosecution of the same science which is to be the groundwork of his future practice.

I do not of course mean to say that all bar students study chemistry, but I do mean to say that all who hope to make any figure in their profession devote themselves to a similarly laborious preliminary course of study bearing more or less directly upon their future duties, before applying themselves to technical details. And if pharmacists hope to raise their calling to the level of a learned profession—which it ought to be—they must be content to pass through a sufficient curriculum, and must prove that they really possess the qualifications with which they desire to be credited.

But do not misunderstand me. I do not blame the pharmaceutical student. We all apportion the means to the end, and the ultimate end is, roughly speaking, to make a creditable living in the career to which we devote ourselves ; that is at all events an obligation which we are bound by the highest moral and prudential considerations not to overlook. Now, under present conditions, the possible end does not justify the adequate means. I am not sanguine enough to expect that the end ever will, in the majority of cases, justify the highest order of means. But much has been done, much remains to be done, and it is the function of the Pharmaceutical Society to do it. It will not be done by trades-unionism, nor by promoting abortive Bills in parliament, seeking a monopoly which no parliament of modern days will ever grant. In this case it will be found that "the farthest way round is the nearest way home," and that the proper course will be to obtain for pharmacy in its corporate capacity every recognition to which it is entitled, and to leave individual pharmacists to fight their own battle under the more favourable conditions thus secured. As to what the future conditions of pharmacy may be, I cannot do better than refer you to a thoughtful paper entitled 'The Future of Pharmacy' which was read by

Dr. Leech at the Manchester Conference, and which you will find reprinted in the Journal of the 24th of last month. It is a singularly well considered analysis of a perplexing question, and well worth reading and careful after reflection.

Now the most obvious grievance from which pharmacy suffers, is its exclusion from any recognized share in the compilation of the Pharmacopœia. This is a stigma which it should not endure one moment longer than it can help. I have so often expressed my opinions upon this point that they need not be repeated. If any one cares to know more about them, they may be found stated (with less qualification than I now think they required) in the paper on pharmaceutical politics already referred to. On more mature consideration I do not think pharmacy has done all that might be expected of it, before it can claim, as of right, to be entrusted with the control of the pharmaceutical department of the Pharmacopœia. That deficiency, however, is about to be made good. At the same time I hold to the opinion that there has been no other body, since the institution of the Pharmaceutical Society, so competent or so logically entitled to prescribe the processes of the Pharmacopœia as yourselves; and as a matter of fact that portion of the work has always been performed by a pharmacist. The Council of the Pharmaceutical Society have now taken the one needful step, by organizing a laboratory for pharmaceutical research, to put an end to this reproach, and to put pharmacy in a position in which its co-operation in the Pharmacopœia must be sought on co-ordinate and honourable terms. In this important step, the Council deserve, and I feel sure they will receive, a generous support from all good pharmacists. Especially may they expect that support from the younger members of the body, who have the strongest interest in the success of the new movement—many of whom will no doubt actively co operate in its development. If this be a new departure, it is one the fitness—I might say the necessity—for which cannot be gainsaid. It will not pay, probably. Pharmaceutical research is not a pursuit that is likely to pay anyone, nor, for that reason, is it a pursuit likely to be prosecuted with an exuberant degree of private zeal, nor should it be left indefinitely to individual enterprise. But these very considerations furnish the strongest reasons why it should be undertaken by the Pharmaceutical Society, why it should be endowed from the funds of the Association which represents the collective aims and interests of the pharmaceutical body.

I do not know whether you will expect me to catalogue the operations that may be undertaken in a laboratory devoted to pharmaceutical research. If definition means limitation, I should certainly decline the attempt. The boundaries of pharmaceutical research are co-terminous with the widest range of pharmacy, they border upon cognate investigations in physiology and therapeutics. Its operations would, in some cases, be simple, but extending over a large field; such, for example, would be the determination of the most suitable alcoholic strength of the various tinctures, a point which had been by no means satisfactorily ascertained when I was conversant with pharmaceutical preparations. Sometimes the investigations would involve skilful manipulation, much scientific experience, and the resources of a specially equipped laboratory. Such, for example, are the determination and isolation of active principles; and I may particularly mention an investigation which has already made its mark in the last Pharmacopœia, and promises to revolutionize that venerable Institution. I refer to the standardizing of the galenical preparations upon scientific principles. It would be a mistake to say that standardized preparations are a novelty, or that they have appeared in the present edition of the Pharmacopœia for the first time. The fundamental notion of every pharmacopœia that ever has been issued is the standardizing of medicinal preparations by means of official formulæ; and there was a time when this standardizing, crude as it was, was level with the scientific knowledge of the age, if I may venture to apply such a term as scientific knowledge to a period when science can scarcely be said to have existed. But science advanced and left the Pharmacopœia behind, and it was reserved for men like Dr. de Vrij and Professors Redwood and Dunstan, who may claim the honourable distinction of Pioneers in this department of pharmaceutical research, to take the first steps in standardizing upon a rational and scientific basis the galenical preparations of cinchona bark, opium, and nux vomica. Does anyone doubt that the substitution of a rational for an empirical standard in the medicinal preparations of these important drugs has been a great gain to medicine, as well as an immense advance in practical pharmacy, and that it marks the Pharmacopœia of 1885 as an epoch in pharmaceutical development? An enormous field of research lies fallow in this direction, and promises an abundant harvest in return for diligent cultivation. It is especially the province of pharmacy to work this soil. No one but a pharmacist is so well qualified to do it. No one but a pharmacist should be allowed to put his plough into it; and if pharmacists occupy the ground as effectually as they should do, no intruder will be able to gain a footing.

Many secondary advantages hang on to the more direct objects of the Research Laboratory. It would form a scientific rendezvous, where therapeutical and physiological investigations may be brought into connection with chemical examinations of the agents employed, and where therapeutists and physiologists may satisfy themselves of the definite composition of their materials, and may obtain new remedies for the prosecution of their experiments. Thus a completeness would be given to pharmacological study, never before reached in this country. This would tend to the closer union of medicine and pharmacy as—what they really are—two inseparable branches of the healing art. It would afford opportunity for young men of talent, who have passed through the ordinary curriculum of the schools, to extend their studies; and this would ultimately develop a "School" of Scientific British Pharmacists, which cannot at present be said to exist.

It appears to me that the Research Laboratory is the only institution which can practically accomplish the object contemplated by Mr. Reynolds in the motion submitted by him to the Conference of 1886, and unanimously adopted by that body, viz., the publication of a formulary of non official remedies. Every one admits the desirability of such a publication. Every pharmacist and every medical practitioner must have experienced the inconvenience arising from the want of it. Everyone would hail it as a relief from the domination of quackery, American or home-bred. The Conference seemed to think this work could be best performed by its own organization. I think they would soon be undeceived, if they are not already. It is not a work suited for intermittent effort or for disconnected operators. If anything needs unity of time and place it is the compilation of a work that is in effect an "extra pharmacopœia," and which in the proportion in which it is successful will be the germ of future Pharmacopœias. And just as we should not contemplate with any degree of satisfaction the relegation of the Pharmacopœia itself to the Conference or to any other body than the Pharmaceutical Society, as the official representative of pharmacy, so I think we should deprecate the consignment of its quasi-official supplement to other hands. It has been suggested to me that I have misapprehended the object of Mr. Reynolds's proposal, which is said to be the publication of the supposed formulæ for Cockle's pills and other proprietary compounds of indefinite and unscientific character. I am not in a position to know whether this is a true picture, and will not hastily believe it possible; but I have no hesitation in saying that the invention of spurious patent medicines is unworthy, both of the

reputation of the Conference and of the pretensions of the Research Laboratory.

There is no need to fear that there will be any lack of work for the Research Laboratory to perform. Let us not trouble ourselves, in this its embryo stage, to map out a plan of operations, of which the only thing certain is that it would not be adhered to. Above all things let us avoid assigning limits to the unknown. It is easy to look back from the electric light to Volta's pile and Galvani's frog, but who shall say to what unsuspected applications the discovery of the most trivial new force may lead? In the meantime there is sufficient motive for action. It will not be this year, nor the next, that all the problems will be solved that go to the perfecting of the next British Pharmacopœia. In solving them a collateral issue of the utmost importance to the credit of pharmacy, one which has cried aloud for solution for the biggest part of this century, will find its answer. The question, namely, whether pharmacists shall have a co-ordinate share in the compilation of their own Pharmacopœia. Let me take this opportunity of stating my belief that the great majority of the medical profession are fully prepared to concede that claim, and would cordially welcome the co-operation of an association of experts, skilled in the very departments in which they themselves are most deficient. If this were the only result aimed at by the formation of a Laboratory of Pharmaceutical Research, the end would amply justify the means; and the attainment of this object by the liberal action of the Council of the Pharmaceutical Society will constitute a better claim upon the gratitude of its members than any other service rendered since its first formation.

This is not the place, nor is your Association the body, to discuss the financial aspect of the question; nor would I venture to allude to it here, even as briefly as I shall do, if it were not that some unfriendly criticisms have been made upon it, which might possibly excite prejudice and involve the proposition itself in an odium which really could only properly apply to its mode of execution. The Council of the Pharmaceutical Society are no doubt expending a large sum of money upon a building, in the upper storey of which it is intended to locate the Research Laboratory. If I may be allowed to express an opinion, it would be that the accommodation provided for research is decidedly meagre, whereas the provision made for carrying on the Society's examinations is of a sumptuous character, but not disproportionate to the importance of the institution itself or to the purposes for which it is intended. It is also necessary to make further accommodation for the extension of the Museum and Library, and the expenditure appropriate to the Research Laboratory appears to me to bear a similar relation to the total to that which the servants' accommodation bears to the total cost of a private residence.

Forgive me for mentioning this matter, and let me respectfully ask you to ignore it in the discussion that will follow.

I will now turn to a very agreeable part of my task. Having hitherto spoken in the first person singular, and said many things of ourselves from our own point of view, let me invite you to the more profitable, though not always equally flattering, spectacle of ourselves "as others see us." And whose opinion should we value so highly—whose praise should we desire so fervently—whose censure should we dread so justly as that of the President of the General Medical Council, the chief of that supreme authority in medical government which directs, publishes, controls, and everything but compiles the British Pharmacopœia?

Sir Henry Acland, addressing the students of Bloomsbury School a year ago, gave expression to these significant words, with which I may fitly conclude this otherwise imperfect address.

Having spoken of the importance of combining the threefold modern researches of the chemist, the physiologist and the therapeutist, Sir Henry continued:—

"Now for this among other reasons the value of a step about to be taken by the Pharmaceutical Society cannot be overestimated. It is decided, as I am informed, to establish a laboratory for the advancement of pharmacology by research. It is to be available for the purposes of investigation and research in chemistry, and other branches of Science relating to Pharmacology. To determine the exact constitution of new drugs and alleged remedies, and the precise composition of alkaloids of acknowledged or hypothetical value, to discover by analysis or synthesis new remedial agents, and to obtain absolutely pure bodies of known constitution for experimental or therapeutical purposes, are all objects suited to and worthy of such a Laboratory. . . . . I know no method by which the Medical Council might more usefully advance the progress of the Pharmacopœia, one of its most important duties, than by aiding research in this Laboratory. It will also have a just claim on the large government grant which is annually given to a committee, including among its members representatives of the Royal Society in every department of biological progress, as well as the Presidents of the Medical Council, and of the Colleges of Physicians and of Surgeons of England."

With these authoritative and encouraging words I will conclude the duty your Executive have honoured me by entrusting to my hands the duty of opening a discussion upon the claims of the intended Laboratory of Pharmaceutical Research to the sympathy and support of this Association. If I have, as I am very sensible has been the case, omitted much that might have been said, and have but feebly expressed that which has not been actually passed over, the remedy, Gentlemen, is now in your hands. Supply the omissions, strengthen the feeble knees, and may you not only arrive at a right and loyal conclusion by your votes, as I do not doubt that you will, but may your words, still more than your votes, encourage the Council in their laudable enterprise, and carry conviction to the minds of that small minority, if such there be, who are in danger of being influenced by a too narrow application of the question, "*Cui bono?*"

The President suggested, in opening the discussion, that the members should begin, leaving the distinguished visitors to speak afterwards.

Mr. J. E. Saul thanked Mr. Giles for his paper, which, he said, could not be considered open to the charge of non-lucidity brought by Mr. Matthew Arnold some time ago against the majority of English writers. He remembered reading with much interest Mr. Giles' paper on 'Pharmaceutical Politics' some years ago, though he did not hear it, and he had much pleasure in moving the resolution which had been entrusted to him. He was not a Bloomsbury Square student, but he declared, nevertheless, unreservedly in favour of the Research Laboratory. The Pharmaceutical Society was a wealthy corporation, and was very properly expending the accumulation of years in this method, than which no nobler could be devised. Mr. Atkins had lamented that pharmaceutical researches lacked the element of finality. People did not take up a subject and stick to it until mastered; nor was this to be wondered at. The ordinary pharmacist with a living to earn could not be expected to search the ends of the earth in such an enterprise. It required exceptional abilities and an exceptional position to succeed in this path. In the proposed Laboratory it would be possible for valuable researches to be made by those who confined their attention to one particular line. The pharmacist would carry out proximate analysis, separating the various alkaloids and neutral principles, resins, gums, etc., as found in the plant, while the chemist would begin where the pharmacist left off, and taking an alkaloid would determine its ultimate composition, and discover perhaps also its proximate con-

stituents, and by this means obtain such knowledge that synthesis would follow. In the republic of science there was no aristocracy but that of ability and achievement, and though the pharmacists of England had hardly yet been admitted as citizens of that republic, he trusted this new departure would go far to obtain for them that recognition. After a reference to the work done by M. Pasteur, he concluded by moving—"That the Laboratory for pharmaceutical research about to be established by the Council of the Pharmaceutical Society, is deserving of the most cordial support of this Association, and that this meeting trusts that the action of the Council of the Society will receive the unanimous approval and support of its members."

Mr. A. J. Phillips seconded the motion, and congratulated Mr. Giles on having so nearly attained one of the ends he had so long been aiming at. It was a pity that such a laboratory had not been established before, for hitherto physiologists and therapeutists had been obliged to do a great deal which was not properly their work.

Mr. W. G. Blackham, in a humorous speech, somewhat found fault with the proposed laboratory, which he thought would be more likely to bring glory to certain gentlemen at the Square than to benefit pharmacy generally. He thought the promotion of chemical science should be subordinated to the attainment of necessary pharmaceutical legislation. Mr. Giles had admitted that the Pharmaceutical Society did not satisfy everybody, not even the majority, and he thought that showed that when it got to the fork it took the wrong road. Very few pharmacists in actual life were ever called upon to make use of even the knowledge they acquired in preparing for the Minor. Pharmacists were already competent to take part in the preparation of the Pharmacopœia, even without a Research Laboratory. He moved as an amendment :—"That the institution of a Research Laboratory at the present time is not profitable ; that it will not confer any benefits upon pharmacists generally, and that considering the present emasculated condition of the Pharmacy Acts, the zeal of the Pharmaceutical Society might be profitably displayed in other directions."

The amendment was not seconded.

Mr. E. J. Millard remarked that Mr. Blackham had on a previous occasion moved an amendment in favour of legislative protection, when also he failed to find a seconder. He should have thought he would have learned wisdom by experience, but he still seemed to be wandering in the wilderness. This laboratory was not intended for purely chemical research alone ; there had hitherto been nothing in this country which could compare with such laboratories as existed on the continent under the direction of Flückiger, Fresenius, and other eminent men, and this would be a step in that direction, and might prevent the necessity of young men going to the continent to complete their education. He hoped the members of the Association would manfully support the Council of the Society in this new departure.

Professor Redwood, being called upon by the President, said it had afforded him great pleasure to be present that evening. He could not go with Mr. Giles in all respects, but he was a very strong advocate for furtherance of pharmaceutical education. The title of the paper appeared, as he himself had intimated, not wholly applicable to the present state of things. At the time when Mr. Giles was a student, and even before, there were provisions for promoting pharmaceutical research that had existed for many years past, and he had observed with regret that for some twenty years they had been in some respects retrograding. He could not agree with Mr. Blackham at all ; the great evil under which pharmacists laboured in this country was that the period of study was much too short. In old times students came to study, not merely to gain a certificate ; men of late looked too much to merely passing an examination, and one of the great advantages likely to result from the establishment of the Research Laboratory was that it would induce students to devote more time to their studies. He hoped one of the effects of the discussion would be that it would stimulate those who had the management of pharmaceutical education to increase the period of study ; for some time past he had been a strong advocate for a return to the old plan of a ten months' course, and the abolition of the five months' course, though he had been in favour of it as a temporary expedient at the time it was introduced. Now, circumstances were altered, and young men should understand that they must first learn the sciences they required pretty thoroughly before going in for Research. It was very pleasing to find there were a number of young men who were competent to undertake these investigations, and, that being the case, opportunities ought to be afforded them of promoting pharmaceutical research, and raising the status of the whole body. His only doubt was whether Mr. Giles was not inclined to push this new departure a little further than the general state of pharmaceutical education would warrant. Great judgment should be exercised in avoiding the increase of qualification to such an extent as to lead the best men amongst them to forsake pharmacy for other occupations.

Mr. H. B. Ince wished to make only one remark, and that was on behalf of students. He did not consider the establishment of this Laboratory was solely a students' question; it was a much higher question than that. But as regards the students he would say that they stood under great disadvantages compared with their continental brethren. When a man came to Bloomsbury Square he began his studies almost entirely at the beginning; now all over the continent the student entered the School of Pharmacy in a condition more akin to that of a man who had passed the Minor; he learned chemistry, physics and botany, to a certain extent in his short course, and if he held a high position in the school his term of apprenticeship was reduced by one year. Then he had to undergo a two years' course in the School of Pharmacy. The British student was in a very different position, and could not fairly therefore be compared, as regarded his power to undertake research, with his foreign compeers ; whatever else was done, that ten months' course should be restored. Notwithstanding all these disadvantages, there was never a time when more enthusiasm was shown by the students, but if he went on for a second five months' course, at the end of that time there was no place for him to remain ; he had either to go home or to go to Germany. In future, there would be an opportunity for him, if he wished, to still pursue his studies in this Research Laboratory.

Professor Dunstan was a strong supporter of this scheme, because it would tend to the elevation of pharmacy and the pharmacist. The only way in which progress could take place in an art like pharmacy was by means of science. He agreed with Dr. Redwood that a five months' course was not sufficient to fit a man for carrying on real scientific work. The greatest advantage of this new scheme would come to the younger men. There was plenty of room in pharmacy for good men, and capable men need not leave it for other pursuits. He hoped the Society would deal with the matter in a liberal spirit, and allow persons to enter it without any fee, and this he believed could be accomplished with an annual expenditure of £500 or £600.

The President asked if Mr. Blackham would like to withdraw his amendment. He thought all his objections had been answered, either beforehand in the paper or in the course of the discussion. He saw no reason why the Pharmaceutical Society should not propose pharmacologists for members of the Royal Society, as the Chemical Society did chemists, when an opportunity was given for real pharmacological work being carried out.

Mr. Blackham declined to withdraw his amendment.

Mr. Giles, having briefly replied, the motion was put to the meeting, and carried with one dissentient.

Mr. H. H. Millhouse then moved that the resolution just passed should be sent to the Council of the Pharmaceutical Society. This was seconded by Mr. Vallance, and carried unanimously.

A vote of thanks to Mr. Giles and to the President of the evening, proposed by Mr. F. Bird, and seconded by Mr. Barnes, terminated the proceedings.

Review.

A Treatise on the Animal Alkaloids, Cadaveric and Vital; or the Ptomaines and Leucomaines Chemically, Physiologically and Pathologically considered in Relation to Scientific Medicine. By A. M. Brown, M.D. With an Introduction by Professor Armand Gautier.*

The subject of this book is one that has within a relatively short time assumed a position of intense interest. It is only about fifteen years since that Professor Selmi gave greater significance to the previously recorded observations of other chemists as to the occurrence of basic substances in the animal economy by announcing that the stomach of a person dying from natural causes might contain substances that were neither creatine nor creatinine, but which would behave towards reagents similarly to vegetable alkaloids, and that the same substances were to be found in alcohol in which anatomical specimens had been preserved. This at once suggested the possibility of an innocent person's life being jeopardized by an erroneous interpretation of the origin of an alkaloidal substance separated from the corpse of a person supposed to have been poisoned. Since then, in the hands of Gautier, Brieger and others, the investigation has widened, until at present, although probably still in an early stage, it has been established that the formation of alkaloidal compounds is an ordinary and inevitable function of animal life, which under certain abnormal conditions results in disease and death.

As a consequence of the comparative novelty of this subject its literature is somewhat fragmentary and dispersed, and a good *résumé* of the present state of knowledge respecting it would be welcome. But we may say at once that Dr. Brown has not supplied the want. Indeed there are passages in his little book that raise a feeling of wonder that he should have ever thought himself competent to the task. It may be, it is true, that a person who persevered in reading the book through would pick up some information respecting the animal alkaloids, since it contains references to the work upon the subject of a considerable number of foreign chemists, and especially to that of M. Gautier; but the extent of the knowledge gained would depend very much upon the reader's power to perceive the meaning of the original memoirs through the obscurations in which Dr. Brown has draped them in putting them into what is presumably meant for an English dress.

As has already been stated, a large proportion of the work is derived from foreign sources, but Dr. Brown is not a successful translator. For instance, as early as the second page of M. Gautier's introduction there is a puzzling passage which connects "molecular modifications brought about in matter *by means of* oxygen" with anaerobic organisms. But on reference to the French text, which is given in the appendix, it is found that M. Gautier wrote, "modifications moléculaires produites dans la matière *sans intervention* de l'oxygène." This mistake is of course attributable to a temporary "nodding" of the translator. But another phase of his shortcomings is best illustrated by quoting a short passage which describes Dragendorff's method of extracting the alkaloids (p. 19):—"It consists in first treating finely divided putrid meat with sulphuric acid diluted to 1-5th —15 c.c. of acid to 100 c.c. of clear bouillie of the hash, left to digest for some hours at 50° C.; it is then filtered and expressed; the residue is submitted to the same treatment. The liquids collected are then evaporated to a syrupy consistence, and exposed in contact with alcohol at 93° C. for twenty-four hours; filtered and evaporated the residuum is then agitated with benzine and immediately decanted. The operation is repeated, ammonia is added to the residuum till alkaline reaction ensues. It is then heated to 40° or 50° C., when it is again exhausted with benzine. By several repetitions we obtain a certain quantity of benzine holding in solution impure alkaloids; this is purified by converting it into sulphates, decomposing with ammonia, recovering with suitable dissolvents and submitting to treatment similar to that we have just described." It can hardly be claimed that this passage is an elegant one, but neither can it be said that in it elegance has been sacrificed to lucidity; yet it is neither better nor worse than many others that are to be found in the book. In another place (p. 23) the reader is told that "Excess of lead is removed from the liquor with sulphurated hydrogen; freed from the sulphurates of lead," etc. Again (p. 28), "The chlorate of mercury does not always precipitate them" (the ptomaines). Again (p. 76), "The oxydizing action of chloride of potash and hydrochloric acid." Then he will meet with a series of solecisms, such as "anhydrid carbonic," "putrid febrin," "aldehydrate of ammonia," "chloroid platinate," etc., etc. Equal carelessness is manifest in the mis-spelling of such well-known proper names as Dragendorff, Schmiedeberg, Pettenkofer, Liebermann and Liebreich, the first-mentioned being spelt no less than four different ways. The best that can be said of these and many similar blemishes is that they will not prevent every reader from understanding what is meant.

The book opens with an interesting "Introduction" by Professor Gautier, which is followed by a series of chapters on the cadaveric alkaloids, or ptomaines, their putrefactive origin, extraction, chemical properties, classification, physiological action and medico-legal import. Next succeeds a similar series of chapters on the vital alkaloids, or leucomaines, the physiological products of animals during life. Alkaloids of the latter class are then treated of in their relation to scientific medicine, in a chapter which may be briefly summarized thus. During life the animal organism has the power of elaborating by physiological chemical processes a number of alkaloids—leucomaines—which are capable of exercising a toxic action upon the organism that gives rise to them. In a state of health these toxic products are separated and got rid of as formed, either by oxidation in contact with the oxygen of the blood or by elimination with the excreta. When from any cause the bowels, kidneys, liver, or skin flag, or become deficient in their functional activity, there is a perceptible increase and accumulation in the circulation of these alkaloids, which then exert their toxic action on the nervous centres and so give rise to disease. In this way many pathological conditions may arise from disarrangement of the nutritive, assimilative, or other functions, which would in fact be the results of auto-infection. In the case of contagious diseases generally, according to Professor Gautier, the specific microbe introduced into the healthy organism plays the part of a living cell, producing detritus that is toxic, and which, consequently upon the usually rapid multiplication of the microbes, soon pervades and poisons the whole system. It will be seen, therefore, that according to this theory the ubiquitous microbe would be remitted to a secondary place in the causation of disease, whilst there are not wanting those who deny its pathogenic importance altogether.

* London: Baillière, Tindall, and Cox. 1887. Demy 8vo. Pp. i.-xv., 1-182. 6s.

Obituary.

GUSTAV ROBERT KIRCHHOFF.

This eminent physicist, whose death took place at Berlin on the 17th inst., was born at Königsberg in Prussia on the 12th of March, 1824. He began his physical and mathematical studies in 1842, in the university of his native city, which he left for Berlin in 1847. Two years previously, however, in 1845, he had attracted the attention of scientific men by a memoir on "The Passage of the Electric Current through a Plane." In Berlin he remained about three years, acting as a private tutor, until in 1850 he was appointed Extraordinary Professor of Experimental Physics in Breslau University. Here he made the acquaintance of Bunsen, who two years afterwards was called to Heidelberg, where in 1854 Kirchhoff followed him, having received the appointment of Professor of Physics and Director of the Physical Institute. It was at Heidelberg, while engaged in the active performance of his professional duties, that Kirchhoff, in conjunction with Bunsen, carried on the investigations that have linked his name inseparably with the subject of spectrum analysis, the first edition of his "Untersuchungen über das Sonnenspektrum und die Spektren der chemischen Elemente" having been published in 1861. Kirchhoff's attention was, however, by no means confined to this one subject, and in the course of the twenty-one years he remained at Heidelberg he published a large number of communications upon various branches of physics, as well as his important work on Mathematical Physics. In 1875 Kirchhoff went again to Berlin, where he was appointed Professor of Physics and was made a member of the Academy of Sciences, and a Privy Councillor. His attention was now principally directed to optical and mechanical subjects, but for some years before his death he suffered from chronic illness. After a holiday of several weeks in the Hartz district, Kirchhoff had returned to Berlin, apparently improved in health, and up to the day before his death seemed tolerably well, but on Sunday evening he was attacked by fever, and only lived till six o'clock the next morning.

ROBERT HUNT.

The death on the 17th inst. is also recorded of Mr. Robert Hunt, F.R.S., formerly Keeper of Mining Records at the Museum of Practical Geology, and Professor of Physics in the Royal School of Mines. He was the author of a treatise on light, but his principal literary work consisted in the editing of three successive editions of Ure's 'Dictionary of Arts, Manufactures and Mines.' Mr. Hunt was born at Plymouth in 1807.

Notice has also been received of the death of the following :—

On the 4th of July, Mr. Thomas Readfern, Chemist and Druggist, Great Harwood, Lancs. Aged 63 years.

On the 29th of September, Mr. Richard Pearce Todd, Chemist and Druggist, late of Robertson Street, Hastings. Aged 67 years.

On the 7th of October, Mr. Henry Sirett, Chemist and Druggist, Brackley, Northamptonshire. Aged 76 years.

On the 15th of October, Mr. Samuel Gunnee, Chemist and Druggist, Chariot Street, Hull. Aged 64 years.

On the 20th of October, at Harrow Road, Mr. John Gibson, Chemist and Druggist. Aged 30 years. Mr. Gibson was an Associate of the Pharmaceutical Society.

On the 20th of October, Mr. Benjamin Tindall Kimber, Chemist and Druggist, Fonthill Road, London, N. Aged 36 years. Mr. Kimber was an Associate in Business of the Pharmaceutical Society.

On the 21st of October, Mr. Robert Williamson, Chemist and Druggist, Lancashire Street, Newton. Aged 69 years.

Correspondence.

Syrupus Ferri Phosphatis Compositus.

Sir,—While preparing a batch of Parrish's syrup according to the formula contained in the Unofficial Formulary it struck me that there was a marked difference between Parrish's formula and the Unofficial one as regards the quantity of phosphates they individually contain. This discrepancy may be partly accounted for by the fact that Parrish's formula does not yield the theoretical quantities, and partly because the Unofficial syrup is said to contain as much phosphates as can be kept in solution,

I have made a number of experiments regarding the quantities which can be retained in solution. As the result I have prepared a syrup, which, although not containing the quantities of Parrish's formula, is richer in phosphates than the Unofficial syrup, and keeps perfectly bright. The method of preparation is a "hybrid" between the process of the Unofficial Formulary and that contained in the Extra Pharmacopœia.

Take of—

Polished iron wire	300 grs.
Concentrated phosphoric acid	℥iv (fluid).
Distilled water	℥ij (fluid).

Dilute the acid with the water in a ten-ounce wide-mouthed bottle, cut the wire into small pieces, and digest the whole at a gentle heat till dissolved.

Precipitated carbonate of calcium	930 grs.
Concentrated phosphoric acid	4 fl. oz.
Distilled water	10 ,,

To the acid diluted with the water in a capacious bottle, add the carbonate in small successive portions, agitating the bottle after each addition, until the whole has been added.

Phosphate of potassium	320 grs.
Phosphate of sodium	160 ,,
Distilled water	5 fl. oz.

Dissolve, mix the three solutions together, filter and set aside.

Powdered cochineal	℥iiss.
Distilled water	15 fl. oz.

Boil for twenty minutes, filter, and wash with sufficient distilled water to produce twenty-five fluid ounces. To this filtrate add—

Granulated sugar	3½ lbs.

Heat till dissolved and strain. When cold add the solution of phosphates, with sufficient distilled water to produce 4 pints of syrup.

Each fluid drachm contains—

Ferri phosphas	1 grain.
Calcii Phosphas	1½ ,,
Potassii Phosphas	½ ,,
Sodii phosphas	¼ ,,

Phosphas.

[*** Syrupus ferri phosphatis compositus is not called Parrish's syrup in the Unofficial Formulary. A syrup prepared according to the above formula would be so much overcharged with the salts that it would not keep, and so unpalatable that no one would swallow it. In our opinion it would be better to reduce the strength and increase the dose, if necessary, as directed in the Unofficial Formulary. —Ed. Pharm. Journ.]

J.T.—The firm referred to is probably that of Merck, of Darmstadt, whose London agent is, we believe, Mr. Boyce, St. Mary Axe.

W. Puckey.—Tyndall's "Heat considered as a Mode of Motion," or Ganot's "Elementary Treatise on Physics."

Zodiac.—According to a description of the diploma given in the first volume of this Journal (p. 264) the shield is supported on the left by an imaginary portrait of Avicenna, holding in his hand the staff of Esculapius, as emblematical of the healing art, and pointing with it to a wreath of medical plants; on the right is an imaginary portrait of Galen, holding in his hand an antique balance.

Communications, Letters, etc., have been received from Messrs. Flückiger, Dott, Allen, Kay Bros., Leman, Baker, Van de Vyvere, Barritt, Bury, C. A. P.

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,,	—	18/-	24/-	30/-	40/-	48/-	VESTS.

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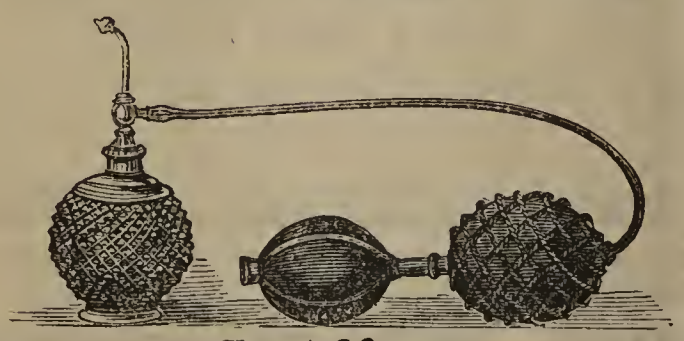

FIG. 5, **36s.**

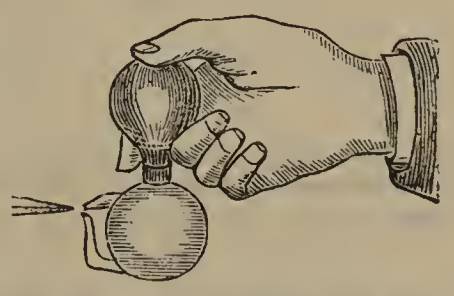

FIG. 2, **18s.** DOZ.

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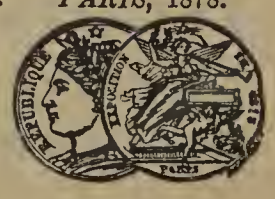

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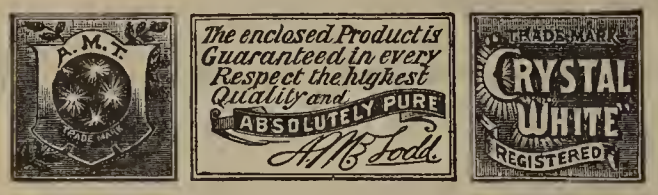

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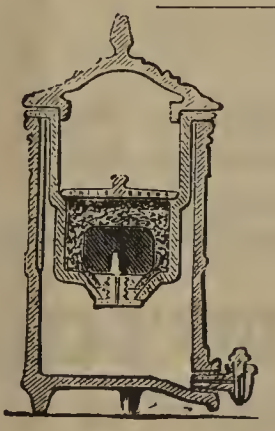

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 906.] SATURDAY, NOVEMBER 5, 1887. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

AN EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday next, November 9th, at half-past Seven.

The chair will be taken at Eight *precisely*.

The following papers will be read:—

"The Alkaloidal value of Ipecacuanha cultivated in India." By F. RANSOM.

"Notes on Trebizonde Honey." By Dr. THRESH.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

EVENING MEETING.

36, YORK PLACE, EDINBURGH.

AN EVENING MEETING of the Society will be held in the Society's House, 36, York Place, Edinburgh, on Wednesday, November 16th, at 8 p.m.

The chair will be taken at half-past eight precisely by Mr. H. BELLYSE BAILDON, B.A. Cantab., F.R.S.E.

The Inaugural Address will be delivered by ALEX. CRUM BROWN, M.D., F.R.C.P.E., D.Sc., F.R.S., Professor of Chemistry, University of Edinburgh.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 2nd day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 5th, 1887.

For list of approved Candidates see Journal, October 22, page ii.

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THE CHEMISTS' BALL.

A MEETING will be held, by permission, at 17, Bloomsbury Square, on Monday evening, November 7th, 1887, at 9 p.m., for the purpose of making preliminary arrangements for the ensuing Ball. Any gentleman desirous of becoming a Steward, and unable to be present, will oblige by informing the Honorary Secretary without delay if such is his intention.

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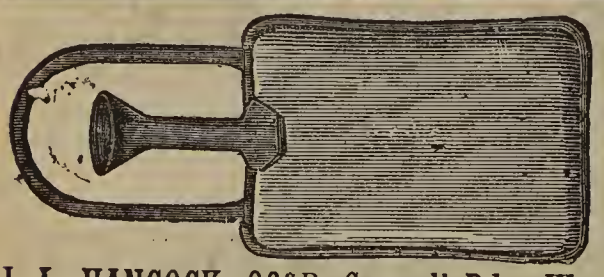

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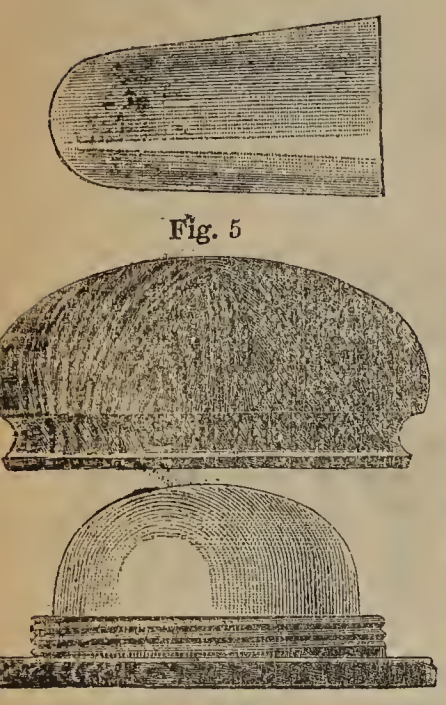

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Fig. 5

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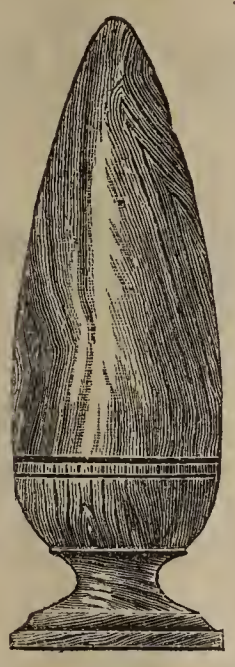

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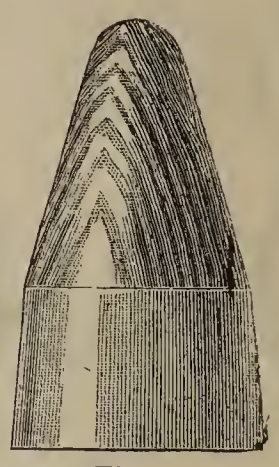

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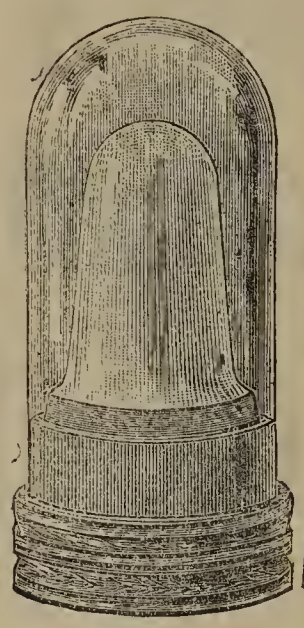

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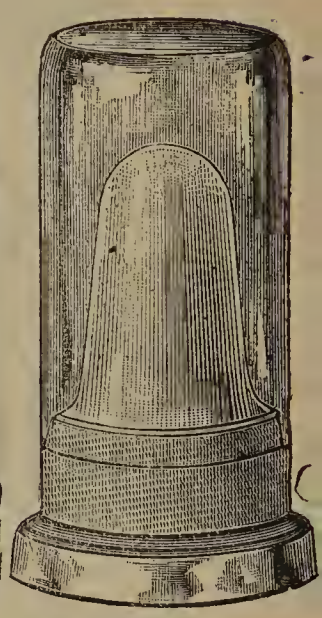

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Fig. 3 & 4.	In Boxwood Cases, per doz., 2/8 and 4/-; in Vegetable Ivory	,,	**4/- and 6/-**
Fig. 5.	In White Opaque Glass Jars, with Red Celluloid Caps	,,	**2/6 and 3/6**
	Mounted, in Stoppered Bottles	,,	**6/-**
Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps	,,	**4/6**
Fig. 7.	On Boxwood Mounts, Glass Covers	,,	**3/6 and 5/9**
Fig. 8.	On Glass Mounts with Glass Covers	,,	**4/6 and 6/-**

S. MAW, SON & THOMPSON, LONDON.

BY SPECIAL APPOINTMENT.

SPRATTS PATENT
MEAT 'FIBRINE' VEGETABLE DOG CAKES

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(WITH BEETROOT).

DOG MEDICINES for the Cure of Distemper, Worms, Mange, Eczema, Ear Canker, Rheumatism, and the various other Canine Diseases. Full List and Pamphlet on Canine Diseases, post free.

"COMMON SENSE OF DOG DOCTORING," price 6d.

DOG SOAP, 6d. per Tablet.

LOCURIUM. Price 6d. and 2s. per Bottle, retail. A Patent Vegetable Oil, curing Sore Feet in Dogs, Cracked Heels, Broken Knees, or Sore Backs in Horses; and Sores, Bites, and Wounds of all kinds, either in man or beast.

Small Pamphlets on Canine Diseases supplied free for distribution.

WHOLESALE TERMS OF **SPRATTS PATENT LIMITED, LONDON, S.E.,** OR YOUR WHOLESALE HOUSES.

"RAMORNIE." LIEBIG'S EXTRACT OF MEAT.

The only Brand supplied to the War Office.

7 lb. Tins	per lb. 5/11	each	41/5	4 oz. Jars	per lb. 6/7	per doz.	19/9
1 lb. Jars	,, 6/2	per doz.	74/0	2 oz. Jars	,, 7/0	,,	10/6
½ lb. Jars	,, 6/4	,,	38/0	1 oz Jars	,, 7/8	,,	5/9

Write for Detailed Price List to the Australian Meat Co., 9 and 11, Fenchurch Avenue, E.C. *6 lbs. Carriage Free.*

BURROUGH'S **SPIRITUS RECTIFICATUS, P.B.**

SPIRITS OF WINE CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.

ALSO FINEST ORANGE WINE AND SHERRY FOR MEDICINAL PURPOSES.

CALE STREET DISTILLERY, LONDON, S.W.

Duty free for Exportation—also best Methylated Spirit at lowest prices.

PUMILINE (PURE ESSENCE AND EXTRACT OF PUMILIO PINE).

Messrs. G. & G. STERN beg to announce to the Medical Profession, and also to Chemists and Druggists, that they have opened a depot at 11, BILLITER SQUARE, E.C., for the continual supply of PUMILINE.

STERN'S PUMILINE, after careful analysis by competent authorities, is proved to be the Pure Essence and the Pure Extract of the Pumilio Pines which grow on the higher altitudes of the Alps in regions of perpetual snow, and is thereby constituted the effectual remedy for Gout, Rheumatism, and Throat and Chest Affections.

The system of Pine treatment for these ailments, in conformity with that so successfully carried out at Homburg, Ischl, Reichenhall, and at other Baths and health-resorts on the Continent, has now for the first time been introduced into this country at the Hydro-Therapeutic Establishment at Farnborough, Hants. Baths and Inhalation Rooms have been erected for the special treatment by Pumilio Pine of patients suffering from Gout, Rheumatism, and Throat and Chest Affections; and the establishment is under the guidance and care of an able English Physician resident on the premises. STERN'S PUMILINE is the Pine Essence and Extract used at the Farnborough Establishment.

PUMILINE is much prescribed by German and Austrian Physicians, and meets with unvaried success. It has also been tried in this country by Medical Men with equal success.

Pamphlet, with copies of Certificates of Analysts, &c., and Samples to Medical Men and to Chemists sent free on application to

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Any Wholesale or Retail Chemist who publishes a Monthly or Annual List of Prices for the use of the general public, or Almanack, will oblige Messrs. A. ROWLAND & SONS, of 20, Hatton Garden, London, by sending them a copy of the last issue and stating number of copies printed and price of advertisement to occupy page or half page facing matter, or on outside back cover. Counter Bills can always be had

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IRISH CAMBRIC

Children's Bordered, per doz. 1/2
Ladies' ... ... „ 2/4½
Gents' ... ... „ 3/6

Hemstitched:
Ladies' ... ... per doz. 2/11½
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SAMPLES FREE. **POCKET HANDKERCHIEFS.**

IRISH DAMASK TABLE LINEN

SEND FOR SAMPLES, FREE.

Fish Napkins, 2/11 per dozen. Dinner Napkins, 4/6 per dozen. Table Cloths, 2 yards square, 2/11; 2½ yards by 3 yards, 5/11 each. Kitchen Table Cloths, 11½d. each. Strong Huckaback Towels, 4/6 per doz. Frilled Linen Pillow Cases, from 11½d. each. Initials, &c., Woven and Embroidered. Samples and Illustrated Price Lists, post free to any part of the World. **ROBINSON & CLEAVER,**

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Importers of American and Continental Drugs, Herbs, and Essential Oils,

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MEDICAL AND SWEET HERBS IN PACKETS. STRAMONIUM AND COMPOUND CUBEB CIGARETTES.

Agents for Messrs. Parke, Davis & Co.'s Concentrations, Fluid Extracts, and Pressed Herbs, also for Messrs. Keith & Co.'s Preparations. DEPOT FOR ALL NEW REMEDIES.

Price Lists, Samples, and Special Quotations on application. Foreign Indents receive special attention.

MENTHOL CONES.

ACMÉ BRAND (Registered No. 38537).

Guaranteed Pure Japan Menthol. *The Cheapest and Best put up Cones in the Market.*

All our Boxwood Boxes may now be had with label printed directly on to the box. Buyer's own name put on at 1/6 gross extra. No charge for large quantities.

Latest Novelty.—No. 217 Glass Show Bottle, as No. 214, 3/3 per doz., the best and largest 6d. Cone made.

No.		Per doz.	Size.
88.	Hard Wood Boxes, Pedestal Shape	2/6	1/
89.	Nickel Screw Capped Bottles	4/6	1/
90.	,, ,, ,, ,, ...	3/8	9d.
92.	,, ,, ,, ,, ...	2/6	6d.
161.	Boxwood Boxes, Acorn Shape	4/2	1/
162.	,, ,, Pedestal Shape, Screw Lids..	3/11	1/
163.	Vegetable Ivory, Acorn Shape	5/	1/
200.	Boxwood Boxes, Pedestal Shape	3/	6d.
201.	,, ,, Barrel Shape, Screw Lids ..	3/11	1/
201B.	,, ,, ,, ,, Extra Large Cone	5/10	1/
202.	,, ,, Bullet ,, ...	3/11	1/
203.	,, ,, Cone ,, ...	3/11	1/
204.	Vegetable Ivory, Castle Shape	5/10	1/
205.	Boxwood Boxes, Cone Shape, each in box ..	3/3	6d.
206	,, ,, as No. 203, Large Size ..	4/8	1/
207.	,, ,, Draughtsman Shape	4/11	1/
208.	Vegetable Ivory ,, ,, ...	6/6	1/
210.	Boxwood Boxes, Acorns, Nickel Plated Caps..	5/4	1/
211.	Vegetable Ivory Boxes, Acorns, Nickel Plated Caps	5/10	1/
212.	Boxwood Boxes, Bullet Shape, reversible end	4/8	1/
213.	Menthol Charms for Watch Chains, &c. ..	2/8	6d.
214.	Glass Show Bottle, with Cone on Stopper ..	5/10	1/
216B.	Boxwood Boxes, Beer Bottle Shape, Large Cone	5/10	1/

209.—NICKEL PLATED PENCIL, WITH MENTHOL AT END, 1s. size, 4s. 6d. per doz.

A Sample Box containing one each of above, 6/-; by post, 7/-.

May be obtained through the Wholesale Houses at above prices. In ordering please quote numbers.

Cones supplied loose at lowest prices. Five per Cent. Discount for Cash with Order.

Special Quotations for large Quantities. *Manufactured only by*

HOCKIN, WILSON & CO., 38, Duke Street, Manchester Square, London, W.

EXHIBITED AT THE

AMERICAN EXHIBITION,

LONDON, 1887.

OVOID CAPSULED PILLS

(Of the British Pharmacopœia and other Standard Authorities).

Originated 1870 by McKESSON & ROBBINS, New York, U.S.A.

London Agency: Messrs. S. MAW, SON & THOMPSON, 7 to 12, Aldersgate Street, E.C.

And can be had also of Messrs. BURROUGHS, WELLCOME & Co., Snow Hill Buildings, London, E.C.; Messrs. HOCKIN, WILSON & Co., 38, Duke Street, Manchester Square, London, W., and the Principal Wholesale Houses in the Trade throughout Great Britain and Ireland.

THE NEW EMMENAGOGUE

(McK. & R.) Pills, Manganese Bin-Oxide, 2 gr.

For the use of Physicians and Surgeons, and to be dispensed in Prescriptions.

Bottles containing 25 Pills each, 9s. per dozen; Bottles containing 100 Pills each, 32s. per dozen.

ALOIN, STRYCHNINE, AND BELLADONNA (McK. & R.)

A tonic laxative granule, prescribed where a painless peristaltic action is required.

Aloin	1-5 gr.
Strychnina	1-60 gr.
Ext. Belladonnæ	1-8 gr.

Dose—One Pill three times a day, morning, noon and night. Where a painless peristaltic action is desired by the aged or female patient, one Pill may be taken every night or second night at bedtime.

ERGOTIN ... ... 3 grs. (McK. & R.)

Each Pill contains the active principles of 30 grains Ergot of Rye, or 30 minims of the Liquid or Fluid Extract.

This Ergotin is prepared with great care from the best quality of fresh selected Ergot of Rye, and it contains, in the most potent form, all the active constituents of the drug.

This form presents many advantages over the ordinary liquid preparations; it is more reliable and uniform in its effect, and is more acceptable to patients, when so administered, and is specially desirable in neurotic treatment.

Terms to the Trade and Revised List of Formulas mailed Free on application.

Private Formulas of 3000 or more Pills made and capsuled to order for Hospitals and large consumers at special quotations.

ADDRESS: **S. MAW, SON & THOMPSON,** 7 TO 12, ALDERSGATE ST., LONDON (The London Agency).

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EARTHENWARE INHALERS

FOR

Hot Water, Infusions, &c.

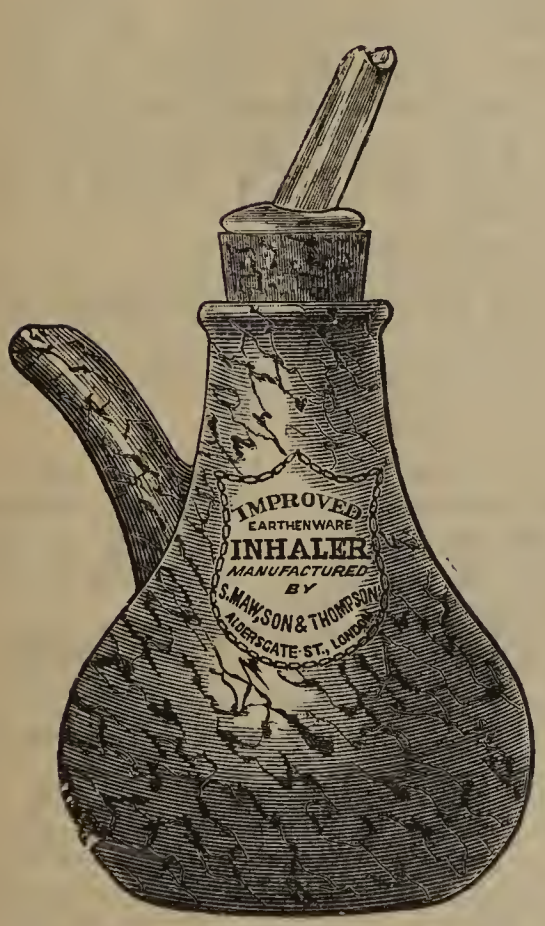

Fig. 8.

MAW'S IMPROVED.

Fig. 6.

MAW'S DOUBLE-VALVED.

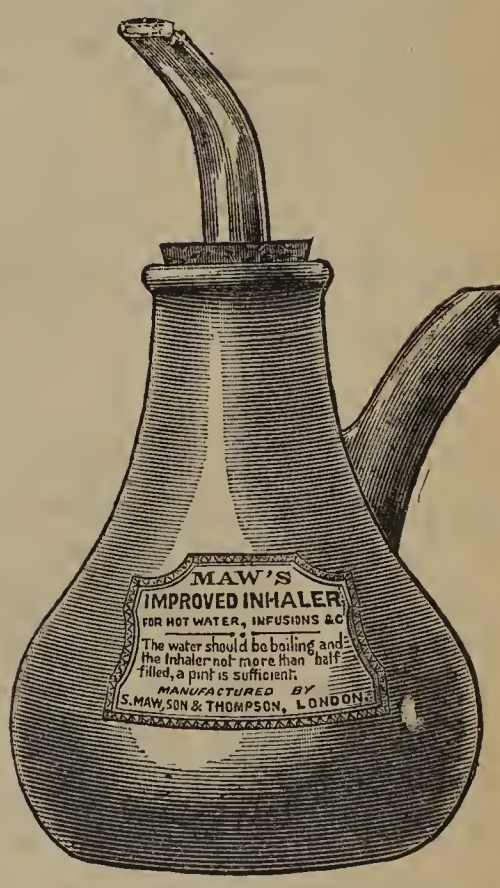

Fig. 8A.

MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.

Fig. 8.—Marbled, 32s. per dozen. Fig. 8a.—White, 21s. per dozen.

ELASTIC TUBES, with Mouthpieces, to fit Fig. 8 and 8a, 7 inches long, 8s. per doz.; 9 inches long, 12s. per doz.

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S. MAW, SON & THOMPSON, LONDON.

HUBBUCK'S PURE OXIDE OF ZINC.

See PHARMACEUTICAL JOURNAL *of May* 1, 1856.

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Allen & Hanburys.
Baiss Brothers & Co.
Barron, Harveys & Simpson.
Barron, Squire & Co.
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Burgess, Willows & Francis.
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Glasgow Apothecaries' Compy.
Harker, Stagg & Moss.
Hatrick, W. R., & Co.
Hearon, Squire & Francis.
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Hewlett, C. J., & Son.
Hill, A. S., & Son.
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Horner & Sons.
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Lofthouse & Saltmer.
Mackay, John, & Co.
Oldfield, Pattinson & Co.
Reynolds & Bransom.
Southall Brothers & Barclay.
Sumner, R., & Co.
Taylor, James.
Warren, A. & J.
Woolley, James, Sons & Co.
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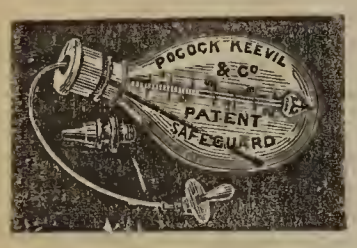
THOMAS HUBBUCK & SON, 24, Lime Street, LONDON.

THE PATENT THERMO SAFEGUARD FEEDING BOTTLES.

RETAIL PRICE, No. 1 ... ... 2s. 9d.
„ „ „ 2 ... ... 2s. 0d.



This marvellously simple yet scientific invention is proving itself such an immense boon to MOTHERS, NURSES, and DOCTORS, that its use is fast becoming universal.
6d. allowed on No. 1 and 3d. on No. 2 Thermometers if returned in good condition.

WHOLESALE OF

POCOCK, KEEVIL & CO.

72, WANDSWORTH ROAD, VAUXHALL, LONDON, and all Principal Sundrymen.

HENRY'S CALCINED MAGNESIA

Continues to be prepared with scrupulous care in the greatest chemical purity, by

Messrs. THOMAS & WILLIAM HENRY, 11, East St., St. Peter's, MANCHESTER

And is sold in bottles, authenticated by a Government Stamp bearing their Names and Trade Mark, "**Henry's Calcined Magnesia.**"

Price 4s. 6d., or 2s. 9d.

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Perfumes, No. 30

A correspondent writes:—"Your Perfumes, at 9s. per pint, are as good as I have hitherto paid 17s. 6d. per pound for."

FIFTY KINDS.

9s. for 20 ozs., carriage paid.

Samples of any kind for 2 stamps.

One Pint, post free, for 9s.

When buying, compare my Perfumes with other makers, and buy the best.

GEORGE DURRANT, Hertford.

London Depot—Messrs. BAISS BROS. & CO.

JAMES'S FEVER POWDER,

Prepared by J. L. KIDDLE, Chemist,

Late of 31, HUNTER STREET, BRUNSWICK SQ., LONDON.

Sold in BOTTLES *containing* ONE OUNCE, *at 4s. 6d., and* PACKETS *at 2s. 9d. each.*

MESSRS. BARCLAY & SONS, 95, Farringdon Street, London, have been appointed Sole Wholesale Agents from this date.

January, 1878. J. L. KIDDLE.

"FOR THE BLOOD IS THE LIFE."

TRADE MARK— "BLOOD MIXTURE."

CLARKE'S WORLD FAMED BLOOD MIXTURE.

The Great Blood Purifier & Restorer.

The celebrated Cure for Scrofula, Scurvy, Skin and Blood Diseases, and Sores of all kinds. Wholesale of all Patent Medicine Houses, less the usual discount.

Sole Proprietors, THE LINCOLN & MIDLAND COUNTIES DRUG COMPANY, Lincoln.

Printed Matter Supplied in any Language for Foreign Agents.

PETROLEUM JELLY

EQUAL TO AND CHEAPER THAN VASELINE.

SANITARY FLUID AND SHEEP DIP,

THE CHEAPEST AND BEST DISINFECTANT.

Grease, Pitch, Asphalte, and all products of Tar and Rosin.

Samples and Prices on application.

GRINDLEY & CO. POPLAR, LONDON, E

CHEMISTS, DRUGGISTS, AND PATENT MEDICINE VENDORS are respectfully reminded they can have a supply of Bills and Posters of

CUPISS'S CELEBRATED

CONSTITUTION BALLS,

Free of cost by Parcels Post with a packet of Balls, towards paying for distribution. To prevent error, send card of address to Mr. CUPISS, Diss, Norfolk.

"THE BEST NATURAL APERIENT."

Persistent attempts are made by interested parties to deceive the public by offering Natural Mineral Aperient Waters with marks, names, and designations very similar to those which are used by the **APOLLINARIS COMPANY, LIMITED,** for the **NATURAL MINERAL APERIENT WATERS** imported by them.

Under these circumstances the **APOLLINARIS COMPANY, LIMITED,** feel compelled to caution the public that the **HUNGARIAN BITTER WATER** sold by the **COMPANY** always bears the name of the **APOLLINARIS COMPANY, LIMITED,** on the Label.

GOLD MEDALS EDINBURGH AND LIVERPOOL EXHIBITIONS.

FRY'S
Pure Concentrated
COCOA

TRADE MARK.

Prepared by a new and special scientific process, securing extreme solubility, and developing the finest flavour of the Cocoa.

PURE — EASILY DIGESTED — ECONOMICAL.

From SIR CHARLES A. CAMERON, M.D., *President of the Royal College of Surgeons, Ireland, &c.*

"I have formed A HIGH OPINION OF ITS DIETETIC VALUE. I have never tasted Cocoa that I like so well. It forms a beverage pleasant both in flavour and odour. IT IS ESPECIALLY ADAPTED TO THOSE WHOSE DIGESTIVE ORGANS ARE WEAK."

33 Prize Medals Awarded to the Firm.

J. S. FRY & SONS, BRISTOL, LONDON, and SYDNEY.

A Suggestion to Chemists wishing to largely increase their Returns.

SELL IDRIS & CO.'S GOODS,

As they are a clear addition to business, many of them not taking the place of goods now sold by Chemists.

IDRIS' FRUIT CORDIALS AND LIQUEURS.

May be used with Hot or Cold Water, and in Winter and Summer. About 30 Varieties. *(See List.)*

IN BOTTLES, ELEGANTLY LABELLED AND CAPSULED.

IDRIS' PALATABLE LIME JUICE.

Lime Juice Cordial and Limetta.

Manufacturing Chemists, Mineral Water Makers, Syphon and Seltzogene Manufacturers, Export and Import Merchants,

ASCHAM ST., KENTISH TOWN, LONDON, N.W.; and 3, WEST ST., FINSBURY CIRCUS, E.C.

Telephone No. 7522.

PATRONISED BY HER MAJESTY.

BARBER'S ORIGINAL CRIMSON MARKING INK,

WHICH IS CHANGED BY HEAT TO A JET BLACK.

Put up for Retail Sale in 6d., 1s., 2s., 2s. 6d. and 5s. Bottles.

ALSO

Barber's Concentrated Liquid **COCHINEAL,** for Colouring Jellies, Custards, &c.

Put up in 6d. and 1s. Bottles.

MANUFACTURED ONLY BY THE PROPRIETORS—

G. BARBER & CO. Club Moor, LIVERPOOL.

Can be obtained through any of the Wholesale Firms in Great Britain, or from FELTON GRIMWADE & CO., Melbourne; ELLIOT BROS., Sydney and Brisbane; KEMPTHORNE PROSSER & CO., Dunedin and Auckland; FELTON, GRIMWADE & CO., Wellington, or direct from the Manufacturers—G. BARBER & CO., Club Moor, Liverpool, England.

TELEGRAPHIC ADDRESS—"CUBANS LONDON."

CRESSWELL BROTHERS

Sponge Importers & Merchants

SPONGES OF EVERY DESCRIPTION DIRECT FROM

GREECE, TURKEY, THE BAHAMAS, FLORIDA & CUBA.

2. RED LION SQUARE, LONDON, W.C.

Buying Establishments at ÆGENA, GREECE, and SMYRNA, TURKEY

Sole Agents for the Cuban Sponge Fishing Company.

Branches at 3, ALBION CRESCENT, GLASGOW; 11, WETERINGSTRAAT, AMSTERDAM.

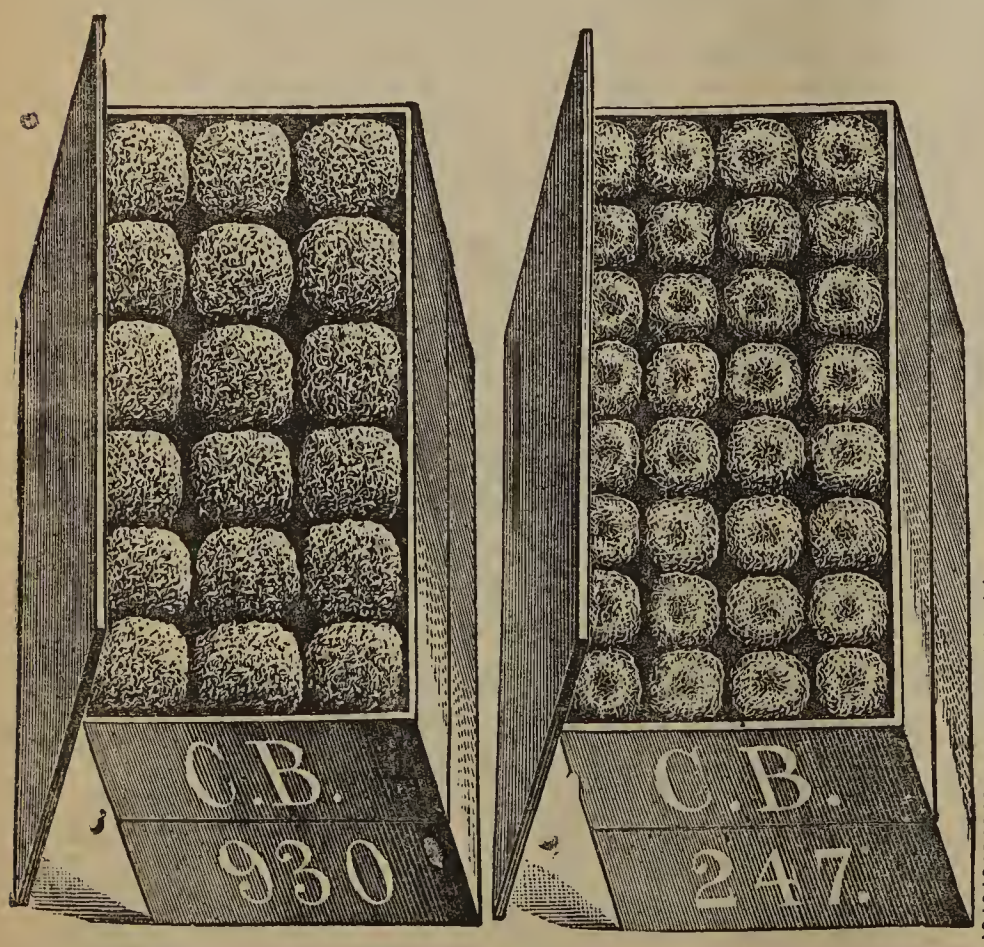
SPONGE

SEASON 1887.

CRESSWELL BROTHERS hold the LARGEST and MOST VARIED STOCK of SPONGES in the WORLD, and their Prices will be found to be the LOWEST IN THE TRADE.

WRITE FOR SAMPLES OF SPECIAL LINES FOR SUMMER DISPLAYS.

WRITE FOR NEW ILLUSTRATED PRICE LIST, JUST PUBLISHED.



SPONGES IN CASES.

SANDED OR SANDLESS.

TURKEY HONEY-COMB SPONGES.

No.	Qlty.		Pieces in case about	Price case
1	1st	Finest selected shapes, assorted sizes	120	240/
2	1st	Do. do.	75	140/
3	1st	Do. do. ..	45	80/
4	1st	Small selected shapes	280	140/
5	1st	Superior do, large Bath sizes	25	140/
6	2nd	Do. quality shapes, assorted sizes	125	160/
7	2nd	Do. do. do. ..	73	84/
8	2nd	Good quality shapes, small ..	280	70/
9	2nd	Do. large Bath sizes	25	100/
10	3rd	Do. assorted sizes	145	105/
11	3rd	Do. do.	85	70/
12	3rd	Do. large Bath sizes	25	60/
13	4th	For Stable use, &c.	100	50/

FINE TURKEY SPONGES.

14	1st	Finest selected Cups, assorted sizes	110	360/
15	1st	Do. do.	60	200/
16	1st	Do. Bath sizes ..	35	240/
17	2nd	Superior Cups, assorted sizes ..	110	240/
18	2nd	Do. do. ..	60	140/
19	2nd	Do. Bath sizes ..	35	180/
20	3rd	Finest Cups, assorted sizes ..	110	180/
21	3rd	Do. do.	65	105/
22	3rd	Do. Bath sizes	35	140/
23	1st	Turkey Solids, assorted sizes ..	100	140/
24	2nd	Do. do. ..	100	110/
25	1st	Flat Saddle, assorted sizes ..	50	190/
26	1st	Do. do.	30	120/
27	2nd	Do. do	50	130/
28	2nd	Do. do.	30	80/

Kindly state, when ordering, whether required bleached or unbleached.

COMMERCIAL SACCHARIN.

BY W. A. H. NAYLOR.

As the characters and properties of this reputed substitute for sugar, described by Mr. Edward D. Gravill in the *Pharmaceutical Journal* of October 22, differ in certain important particulars from the results yielded me by a recent examination of Fahlberg's saccharin, I ask permission to place my observations on record.

The sample in question was taken from a stock of ten kilogrammes. It presented the appearance of a white amorphous powder, and when viewed under a ¼-inch objective no crystalline structure was discernible. It had a decided odour which to my mind recalled that of myrrh. On the palate it produced a sensation of sweetness which was intense, somewhat sickly, and unpleasantly persistent. Heated in an air bath it gave a slight sublimate at 110° C., at 172° C. it assumed a pasty condition, but liquefied only when the thermometer registered 197·5° C.

Parenthetically it may be remarked that in a pamphlet issued by the agent for Great Britain it is stated that saccharin fuses at a temperature of about 200° C. A little below 200° C. white fumes appeared, which condensed into colourless slender needle-shaped crystals from one-eighth to one-quarter inch in length. These were distinctly sweet and contaminated with amorphous matter. In some of their reactions they corresponded with benzoic acid, but having failed to obtain them in sufficent quantity and in a state of purity to determine their melting point, I reserve my judgment in respect of their identity. Crystals having similar characters and properties appeared upon heating together an intimate mixture of calcium oxide and saccharin.

Ignited with free access of air my sample gave a residue amounting to not less than 6·67 per cent. It failed to liberate boracic acid from a solution of borax either in the cold or on boiling or after being kept over a water-bath for four hours. When introduced into a strong boiling solution of potassium ferrocyanide, green particles immediately separated, which after subsidence were seen to be of the same characteristic colour. The decomposition was accompanied by the elimination of hydrocyanic acid. When similarly treated with potassium ferridcyanide a faint odour of hydrocyanic acid was evolved, and the solution, after copious dilution with water, was of an apple-green colour.

The method recommended by Schmitt* for the detection of saccharin was put to the test, and both its delicacy and accuracy were verified. "It is based on the fact that Fahlberg's saccharin yields sodium salicylate on fusing with sodium hydrate." "The fused mass is dissolved in water and tested for salicylic acid by acidifying with dilute sulphuric acid, shaking with ether, evaporating the latter, and adding a drop of ferric chloride solution to the residue."

The three points which I desire to emphasize on account of their wide divergence from the results already referred to, as published by Mr. Gravill, are the temperature of fusion, the amount of fixed residue, and the non-liberation of boracic acid from a solution of borax. It is pertinent to note that Mr. Gravill is careful to point out that the sample to which his notes refer represents a portion of the first supply offered as a commercial article. He concludes it also represents that which now occurs in commerce. On what hypothesis is this remarkable difference to be explained? Assuming accuracy in their work for both experimenters, which is to be *the* article for the future? and, if variable, will its fluctuations in price correspond with the variations in the proportions of the fixed residue?

Of equal importance to the pharmacist is the question of its pharmaceutical uses. As a flavouring agent for disguising the taste of unpalatable mixtures and for toning down concoctions intolerable of exhibition from their bitterness, it will doubtless prove serviceable, but at present the scope of its application must be in general limited to proprietary articles and to medicines prescribed by the physician. To employ it as an adjuvant to official remedies would assuredly not be justifiable.

I can conceive that "the manner in which it lingers on the palate" may prove an objection to its use in cases where the growing tendency has been to exhibit a combination of drugs or their preparations in a *tasteless* form.

* For abstract, *vide The Analyst*, October, 1887, p. 200.

THE UTILIZATION OF WASTE PRODUCTS.*

BY ALFRED H. ALLEN, F.I.C., F.C.S.

President of the Society of Public Analysts.

Dirt has been cleverly defined as "matter in the wrong place." Similarly, we may define waste as "a valuable product, the use of which remains unknown."

In almost all manufactures we find the production of the primary article attended with the formation of one or more secondary products which it is the natural aim of the technologist to utilize. Thus, in the manufacture of iron from the ore, we get slag and combustible gases as secondary products.

Sometimes the secondary product becomes, through a change in commercial conditions, the primary aim of the manufacturer, the article for which the process was first conducted occupying the second place. A remarkable instance of this occurs in the manufacture of soda by the Leblanc process. The first stage in its manufacture consists in treating common salt with sulphuric acid. There is thus obtained sulphate of soda, which is the primary product, and is ultimately converted into the more serviceable forms of caustic soda and carbonate of soda, while at the same time there is produced a large quantity of hydrochloric acid in the form of gas. This formerly had but a limited application, and was allowed to escape in the neighbourhood of the alkali works, many of which were situated at St. Helen's and Widnes in Lancashire, with the result that the vegetation for miles round suffered most severely. Under the first Alkali Act, manufacturers were compelled to condense 95 per cent. of this hydrochloric acid. This at first was regarded as practically an impossible feat, but it was found by passing the gas up a tower filled with coke, down which a stream of water was allowed to trickle, that condensation could be readily effected. Alkali inspectors were appointed to see that the Act was properly carried out, and the arrangements soon became so perfect that instead of merely complying with the Act, and condensing 95 per cent. of the acid gas, the condensation of 99 per cent. became common. It became necessary, however, to find some outlet for the liquid hydrochloric acid which was produced by the condensation, and this soon became utilized for the production of chlorine, which itself was absorbed by slaked lime to form the ordinary chloride of lime or bleaching powder. The manufacture of chlorine from hydrochloric acid was conducted by heating the

* A paper read before the Sheffield Literary and Philosophical Society.

latter with a mineral known as black oxide of manganese, an article which is familiar to Sheffield steel-melters. The secondary product of the reaction was a very acid liquid containing chloride of manganese, which, from its corrosive character, proved very objectionable when run into drains or rivers. By the genius and industry of the late Mr. Walter Weldon, the manganese in this secondary product was recovered, and a perfectly neutral and harmless effluent produced. The result was an enormous saving in the cost of producing chlorine and a consequent impetus to the manufacture of chloride of lime, which is employed in very large quantities, not merely as a disinfectant, but for bleaching cotton and linen; its manufacture is, in fact, at the present time, one of the great industries of the country. Meanwhile, the sulphate of soda, which I have already referred to as the primary object of the treatment of common salt with sulphuric acid, has become of less value than formerly, owing to the competition of the so-called "ammonia process" of manufacturing soda carried out at the works of Messrs. Brunner, Mond and Co., at Northwich. This process runs the Leblanc method of soda manufacture so hard that the latter may now be said to be struggling for its existence, and the profit on the manufacture of soda by it has practically disappeared. But the ammonia process does not result in the production of hydrochloric acid, nor consequently of chlorine or chloride of lime, and as chloride of lime is required in such enormous quantities, it has become the primary object of the alkali manufacturer, who may now with greater propriety be called an "acid manufacturer," his principal raw product being the hydrochloric acid which he used to send up his chimney-stacks because he thought it too much trouble and too expensive to condense it.

The utilization of the waste products from the manufacture of coal-gas is one of the most curious chapters in the history of chemistry. Thus when coal is distilled there are obtained, as primary products, illuminating gas, coke, tar, and ammoniacal liquor. The quality of these products largely depends on the temperature and other conditions under which the distillation is conducted. Thus when coal is distilled primarily for the purpose of producing illuminating gas, as in our ordinary gas-works, the coke is of inferior quality, while the tar is superior. For many years it was a matter of regret with technologists that no successful attempts had been made to utilize the waste gas and tar produced when coke was the primary object of manufacture, as in coke-ovens. Now, however, this is successfully done, but the tar produced varies greatly in character, according to the special kind of coke-oven, that from the Simon-Carvé ovens being very similar to ordinary gas-works tar, while that from the Jameson and other coke-ovens is of very little value.

Everyone is familiar with the general fact that gas-works tar is now the raw material from which countless products are obtained remarkable for their colour, their medicinal value, and other useful applications. These products have been actually created by the chemist. Many of them have no existence in the animal or vegetable world, while others which have a natural existence, as, for instance, benzoic acid in gum-benzoin, can now be produced from coal-tar by synthetical means at a mere fraction of the cost of the natural product. The same thing is true of alizarin, which is the basis of the so-called Turkey-red dye, so familiar to all of us. The production of alizarin from coal-tar has resulted in the entire abandonment of the cultivation of madder, the natural source of alizarin, and the same may any month happen to the culture of indigo, a colouring matter which can now be produced in a state of purity from coal-tar, but not, so far, at a price which will enable it to compete successfully with the natural product. For some purposes, however, the artificial indigo is found more convenient, and hence already receives a somewhat limited application.

Similarly, there have been recently made from coal-tar a number of bodies remarkable for their antipyretic and antifebrile characters, and more than one of the active principles of plants known as alkaloids have been synthetically prepared; in fact the artificial production of quinine itself from coal-tar may now be regarded as fairly within the range of practical possibilities. The cochineal industry is another which is threatened with extinction by the production of the azo-scarlets from coal-tar, though these bodies are very different chemically from the colouring matter of the cochineal insect.

The production from coal-tar of the intensely sweet substance called saccharine is another instance of the creation of a new product likely to have an extensive practical application, and that in cases in which sugar is unsuitable.

There is a curious mistake which has occurred so frequently when non-scientific persons have been in conversation with me that I feel it will not be out of place to refer to it on this occasion. Continually we have the iridescence observed on a pool of water where tar has been spilt regarded as a practical illustration of the existence of brilliant colouring matters, and people seem to think that these exist ready formed in the tar. Of course the iridescence in question is purely an optical effect, due to the same cause as the brilliant hues of the soap-bubble, and can be produced by any film which is sufficiently thin. A drop of colourless oil of turpentine on the surface of a dinner plate of inky water will show the colours as brilliantly as the soap-bubble or the pool of tarry water.

As a matter of fact all the known constituents of coal-tar, with very few exceptions, are colourless bodies. The black colour itself is probably due to free carbon, and when the tar is distilled the fresh distillates have but little colour. It is true that certain fractions are known as "red oils" and "green oils," but a little colouring matter goes a long way in such cases.

It is as much a mistake to suppose that the aniline dyes and other coloured substances deriveable from coal-tar exist ready-formed in the crude material, as it would be to look for ready-made cakes of scented toilet soap in a cocoa-nut or a live sheep.

In front of you is a graphic representation of the chief substances obtainable from coal-tar. It is arranged after the fashion of a genealogical tree, and is the ingenious production of my friend Mr. Benjamin Nickels.

People often are inclined to ridicule the long names given by chemists to the products of the laboratory, but in defence it must be remembered that these products of organic synthesis are so numerous that casual names would be perfectly useless, and hence names which to any competent chemist are descriptive of their nature, origin, and general properties, are absolute necessities. The scientific name of a synthetic organic substance may be compared to a placard bearing the full name of a man, together with his occupation and address, his titles of honour, and very often whether he is strong in his attachments, is right or left handed, and looks with both eyes in the same direction, to say nothing of giving the names and occupations of his parents and ancestors, and the number, ages, and dispositions of his children. It is no exaggeration to say that the full systematic names of many chemical substances are capable of affording to the chemist, conversant with that particular branch of the subject, an amount of information comparable with the case just supposed.

To take a single example of a not very complex kind, there is a certain artificial colouring matter commercially called "Helianthin." It dyes silk a fiery orange hue, and is used by chemists in place of litmus to indicate the point of neutrality. The trade name of helianthin or "Orangé III." indicates nothing of the nature of the substance, though otherwise convenient. Now the systematic chemical name of this body is ammonium dimethylamidoazobenzenesulphonate.

This name, which at first strikes one as ludicrously

long, is really descriptive of the nature and origin of the substance. Thus, expressing the elements carbon, hydrogen, nitrogen, oxygen and sulphur by their initial letters, we find that the name of the substance indicates it to have the following descent.

The name benzene is applied by chemists to a hydrocarbon composed of six atoms of carbon and six of hydrogen, expressed by the formula, C_6H_6 or $C_6H_5.H$.

Azobenzene signifies benzene in which one atom of hydrogen has been replaced by nitrogen (azote) thus:— $C_6H_5.N$, or preferably doubled, $C_6H_5.N:N.C_6H_5$.

Amidoazobenzene will be azobenzene in which one atom of hydrogen is replaced by the group NH_2, called amidogen. Methylamidoazobenzene will be a body in which one of the hydrogen atoms of the amidogen are replaced by the group methyl, CH_3, and the dimethyl-derivative one in which both such hydrogen atoms are replaced. A sulphonic acid is a body in which the group SO_3H replaces a hydrogen atom, and a sulphonate is a salt of such acid. Ammonium salts contain the compound group, NH_4, which plays the part of a metal and hence can replace hydrogen in an acid. Now, with this general explanation it becomes easy to trace from its name the genealogical descent of ammonium dimethylamidoazobenzenesulphonate, thus:—

1. Benzene	$C_6H_5.H$
2. Azobenzene	$C_6H_5.N:N.C_6H_5$.
3. Amidoazobenzene	$C_6H_5.N:N.C_6H_4.N\left\{\begin{matrix}H\\H\end{matrix}\right.$
4. Dimethylamidoazobenzene	$C_6H_5.N:N.C_6H_4.N\left\{\begin{matrix}CH_3\\CH_3\end{matrix}\right.$
5. Dimethylamidoazobenzenesulphonic acid	$\left.\begin{matrix}C_6H_4\\SO_3H\end{matrix}\right\}N:N.C_6H_4.N\left\{\begin{matrix}CH_3\\CH_3\end{matrix}\right.$
6. Ammonium dimethylamidoazobenzenesulphonate.	$\left.\begin{matrix}C_6H_4\\SO_3(NH_4)\end{matrix}\right\}N:N.C_6H_4.N\left\{\begin{matrix}CH_3\\CH_3\end{matrix}\right.$

By adding up the various atoms of carbon, hydrogen, etc., in the substance it will be found that the empirical formula of helianthin is $C_{14}H_{18}N_4O_3S$. But such a formula gives comparatively little information as to the nature of the substance. In fact the empirical and constitutional formulæ are related to each other in much the same manner as are the commercial and systematic names of the substance.

Having the systematic name of the substance, and being thus able to plan out its constitutional formula, a chemist will find it a comparatively easy matter to devise methods for its formation; but without a knowledge of the constitution of a substance, he will be working in the dark, and will have but little chance of success. That is just the present position of the chemist with respect to albumin and several allied bodies, which, in addition, are very difficult to purify, and have empirical formulæ of extreme complexity. It is evidently by studying the products of decomposition of a body that we can best attain such a knowledge of its constitution as will enable us successfully to essay its synthesis, as has been done with alizarin, indigo, salicylic and benzoic acids, oil of bitter almonds, and many other substances.

(*To be continued.*)

RECENT RESEARCHES IN BOTANY.*

BY E. G. BAKER, F.L.S.

The state of botanical research in this country at the present time is in a decidedly encouraging condition. For a long time English botanists have taken a leading part in systematic botany; but in histological and physiological botany there has been a great lack of original work. Now it seems likely that this will be changed. A new school has arisen, and at the leading universities a regular course of practical work is annually given. Some of you may have noticed as evidence of this activity the numerous works recently published.

An excellent work on practical botany by Bower and Vines will be found all that can be desired for laboratory work, while students of three or four years ago will remember having to rely on Sach's 'Botany' as an advanced text-book. The different parts which compose this work are now published separately with much amplification by the Clarendon Press, Oxford.

Only last month a new journal called *Annals of Botany* first saw the light, showing that the present publications were inadequate to meet the demand. It specially deals with physiological, morphological and histological botany, and the papers are copiously illustrated.

In saying a few words, then, on "Recent Researches in Botany," the difficulty is not want of material, but rather the reverse. I have endeavoured, therefore, only to select such matter as may be of general interest.

First of all I would refer to some "Notes and Queries on Gentians," by Professor Huxley. It may, perhaps, surprise you to find Professor Huxley writing a botanical paper, but he has written a very valuable and interesting one, and which is well worth a little attention.

Having to spend some six weeks in Switzerland during August of last year, he was much attracted by the Alpine vegetation, and especially by the gentians; so much so, that not only did he examine the few species that grow wild there, but on returning home he devoted himself to a complete review of the whole natural order Gentianaceæ. At the time he was in Switzerland two species were principally in flower, and I was much struck by a statement he made, which was that if he gathered two or three specimens he found no difficulty in giving their names, but that if he gathered fifty, so great was their variation, that it was almost impossible to state definitely where one species began and the other ended. This I find to be one of the chief difficulties in systematic botany. In a great many natural orders the descriptions of the various species have to be drawn up so as to allow of a certain range of variation, and even then if you have a good supply of specimens you are nearly sure to find some one or two that act as connecting links between the species.

Professor Huxley has done for the gentians what he and other Darwinian zoologists have done for many groups of animals. He has worked at them and endeavoured to trace their relationship to one another, and to see how far they can be made to conform to one common type, just as he showed in a well-known paper that the horse, ass and zebra were all descended from a single common miocene ancestor.

After examining the flowers of a large number of the Gentianaceæ he found that nectaries were present, and that the nectarial surface was sometimes situated on the corolla and sometimes at the base of the ovary. This then formed the main point in his system of classification.

The natural order Gentianaceæ is well suited to a critical examination of this character, as it is a well-marked one, and its limits are fairly well defined. Arranging, on the one hand, the flowers of this natural order having nectaries on the corolla, and on the other those having nectaries at the base of the ovary, Professor Huxley pointed out the lines along which the probable evolution of the Gentianaceæ have taken place, and also sketched a hypothetical ancestor.

It is interesting to note that this arrangement, which I think I may call a biological arrangement, differs materially from the ordinary arrangement, such as given, for instance, in Hooker and Bentham's 'Genera Plantarum.'

Passing now from a consideration of the structure of the "gentians," I would turn your attention to a certain abnormal phenomenon in the life history of a fern known as "apospory," whereby the usual life cycle is shortened. Professor Bower has shown that in the case of *Athyrium*

* Read at a meeting of the Chemists' Assistants' Association, October 20.

Filix-fœmina var. *clarissima*, Jones, complete sporal arrest occasionally takes place; the sporangia instead of developing spores develop into prothalli. In *Polystichum angulare* var. *pulcherrimum*, Padley, this phenomenon also takes place, and, furthermore, prothalli have been observed to develop from points on the frond away from the sori—in this case, then, the sporangium is also eliminated.

The phenomenon of apospory may be considered as a mere sport, but certainly a peculiar one, interfering, as it does, to such a large extent in the life history of the plant concerned.

A good deal of attention has lately been paid to the effect various chemicals have in stimulating and retarding growth in plant life.

At the recent meeting of the British Association in Manchester, Dr. Vines mentioned some experiments he had been making with the two alkaloids, atropine and physostigmine. Everybody here doubtless is acquainted with the action of these two bodies when used in eye operations, the one dilating the pupil of the eye, and the other causing contraction. They possess very marked properties—the one being exactly antagonistic to the other, so are well suited for experimentizing with. Their action was tried on the common sensitive plant (*Mimosa pudica*), and it is interesting to note that, as in the case of animal tissues, the result obtained was stimulation of the vegetable cell in the one case, and contraction in the other.

This effect of stimulating vegetable growth has been the subject of a series of experiments conducted at Cambridge by Anna Bateson and Francis Darwin. If the turgescent pith from a growing shoot is freed from the external tissues, it exhibits a sudden increase in length. It also exhibits increase in length if placed in damp air or water.

This latter fact, and the possibility of accelerating and retarding the rate of increase in length by various reagents, was made the point of a number of careful observations.

The pith, obtained either from the Jerusalem artichoke (*Helianthus tuberosus*) or sunflower (*H. annuus*), was attached to the bottom of a narrow glass jar, the upper end being connected by means of a thread of plaited silk with the short arm of an auxanometer-lever in order that any increase in length might be accurately measured.

If a strip of pith is filled up as here described and the jar is then filled with water, the elongation as exhibited by the descent of the long arm of the lever is most striking; indeed, so rapid is its movement, that it travels in many cases over ten millimètres in one minute.

The stimulating effect of alcohol was first tried. Methylated spirit 2 per cent. being used, the acceleration was 100 : 150.*

The stimulating effect of ether vapour was then tried, the pith in these experiments being allowed to grow in damp air. A known quantity of ether was poured into a jar of known capacity. The mouth of the cylinder was closed by a divided glass disk which allowed the passage of the thread attaching the pith to the lever.

The atmosphere of ether was kept as constant in strength as was possible. The following table shows the percentage of ether in the atmospheres which caused acceleration, the amount of quickening being given in a parallel column.

Percentage of ether.	Accelcration of growth.
0·27°	100 : 118
0·37°	100 : 146
0·40°	100 : 200

With chloroform the results were—

Per cent.	
0·008	Retardation of growth.
0·05	No effect.
0·1	No effect.
0·9	Slow contraction.

An aqueous solution of camphor, said to be 0·1 per cent., was tried, but no effect on the "growth" of the pith was observed.

Weak solutions of ammonia were found to have a well marked stimulating effect.

Strength of solution.	Amount acceleration.
0 5	100 : 145
1·9	100 : 103
2·0	No effect.
2·2	100 : 121
2·4	100 : 129

Various acids were tried. As a rule they had no accelerating effect on growth, but caused either retardation or actual contraction of the pith.

Acetic acid and hydrochloric acid caused decided retardation. The effect of nitric acid was not very evident.

Carbolic acid of ·5 per cent. and 1 per cent. did not seem to have any effect, but 3 per cent. caused a contraction of the pith.

The effect of prussic acid was very striking. It did not produce a contraction, as might have been expected, but either a temporary acceleration or else a remarkably steady high rate of growth continued for a prolonged period.

The effect of quinine was tried, aqueous solutions of quinine chloride being used, ranging between ·15 per cent and ·34 per cent.

The result was retardation, followed in a few minutes by contraction and death.

These results appear to me particularly interesting. I do not wish to comment on them further than just to draw your attention to the two last cases, where it will be remembered that while hydrocyanic acid caused acceleration the effect of quinine was contraction and death.

Before concluding I should just like to say a few words on some of the work that takes place at Kew. Very few of those who take a casual stroll through the gardens or greenhouses have any idea of the work that is done, so to speak, behind the scenes. Kew Gardens act as a sort of nursery for any vegetable economic product that may be found. The plant is there grown and propagated, and when the time arrives distributed anywhere among our colonies where it will grow.

Thirty years ago it was cinchona that was being taken in hand—to-day it is plants like the coca plant (*Erythroxylon Coca*). The effect in the former case is apparent to all who have watched the price of quinine for the last few years; the effect in the latter case remains yet to be seen.

One of the most recent arrivals at the Gardens is a packet of *Gymnema*, the plant that is said to take away the power of taste; whether this will prove to be worth growing and propagating must also be left as yet unsettled.

There are many plants which will shortly have to be taken in hand, as the extermination of the wild stock is proceeding at a rapid rate. Foremost among these may be mentioned india-rubber. The supply of this article is obtained from uncultivated material, but this is rapidly being exhausted, and needs replenishing. It is work of this character that the authorities at Kew undertake to superintend and carry out to the best effect. Surely this judicious distribution of economic products is botanical research of a very practical kind.

Before leaving the subject of Kew Gardens, I would remind any student who may be here that there is a part of the Gardens that is now set aside specially for their benefit. Here the plants will be found arranged in beds

* One hundred represents a definite amount of acceleration, *i.e.*, increase in length at the rate of 0·46 million per minute.

and classified according to their natural orders, and anyone so wishing is allowed to pick and dissect the various flowers that will be found there. Whether the student's object be to do a little botanical research on his own account, or shall I say only to get up the characters of the orders for an examination, everything will be found suited to his requirements.

There are many more points that might have been discussed as being recent researches of a botanical character. The "Present Aspect of the Cell Question" affords material for a paper all to itself. The phenomenon of "Karyoikinensis," or method of division of the cell nucleus, has only comparatively recently been thoroughly investigated. Then we have what is called "Continuity of the Protoplasm." Walter Gardiner and others have shown that in certain cases thin threads connect the protoplasm in adjacent cells, and that these threads can be made clearly visible by staining them with some suitable medium.

I have treated shortly of one group of cryptogams, but comparatively recently another of the groups of that division of the vegetable kingdom has been the subject of research, I refer to the Lycopodiums, or club mosses. Professor Treub, of the Buitenzorg Botanical Gardens, has filled in one or two phases of the life-cycle of these plants, having found their prothalli and traced the development of the same.

All this will show you that at present botany is not standing still, but that there are earnest workers doing good work.

LEVICO AS A HEALTH RESORT.*

At the entrance to the beautiful Sugana valley, on the high road from Trent to Bassano, and facing a picturesque lake, is situated the small village of Levico. The mineral water proceeding from Monte Fronte, at the base of which the village lies, has been in repute for two centuries, and Levico has long been a resort for invalids. Yet it is only of late years that it has attracted the sick and suffering from all quarters of the world. Even now Levico water is less known in England than mineral water in many other parts of the Continent.

Two springs were formerly turned to account; the stronger one was employed for the production of sulphate of iron, the weaker one for drinking purposes, while both are now used for alleviating or curing many maladies. It was not till the end of the last century that the medicinal virtue of the water received adequate recognition. The first bath-house was erected in 1814. In 1816 the use of the stronger of the two springs was forbidden by the Government authorities, after Dr. Pinali, of Trent, had discovered and reported that the water contained arsenic. However, permission to use the water as a medicine was granted when it was found that those who drank it in moderation were not poisoned, but, on the contrary, were cured of their ailments. Since then the arsenic has made it prized. The proprietors of the Levico water boast that no other one is so rich in this popular poison; the proprietors of the Roncegno water make the same boast. I have tried to ascertain which is in the right, with the result of finding it impossible to reconcile the conflicting evidence. As the chief importance of both mineral waters consists in their arsenico-ferruginous character, it may save other inquirers some trouble if I give the conclusions at which I have arrived regarding them.

It is scarcely necessary to say that a keen rivalry exists between Levico and Roncegno; they are close together, and the inhabitants of the one seem to think it wrong to admit that any good water can proceed from the other. A like jealousy exists between Carlsbad and Marienbad. The mineral water is almost identical in both, the only difference being that in the one it is warm and in the other cold, but the stranger who asks a native of Carlsbad what he thinks of Marienbad or a native of Marienbad what he thinks of Carlsbad will be assured that the place about which he asks is the one to be avoided. Rival watering places resemble rival beauties in their inability to do justice to each other's merits; it may be added with perfect truth that they are both eager and accustomed to speak evil one of another. In Dr. Weiss's small work upon Roncegno it is said that while the Roncegno water contains 67 milligrammes of arsenic to the litre, that of La Bourboule contains 14, and Levico little more than one only. He makes the mistake of saying that Levico is in Italy, whereas, like Roncegno, its near neighbour, it is in the Austrian Tyrol. Perhaps he under-estimates the quantity of arsenic in La Bourboule water, though the figures which he gives correspond with those published in Dr. Macpherson's 'Baths and Wells of Europe.' On the other hand, Dr. Burney Yeo, in his 'Climate and Health Resorts,' represents La Bourboule water as containing 28 milligrammes of arsenic to the litre. The proprietors of the Levico water have published an analysis of it made by Professor L. Barth and Dr. H. Weidel, of Vienna, according to which it appears that the proportion of arsenic in it is not 1 milligramme to the litre, as stated by Dr. Weiss, but is 90 milligrammes. These two chemists style this water unique of its kind. The figures which they cite justify them in so doing, yet they might have been more comprehensive in their comparisons. They show how much stronger in arsenic is Levico water as compared with the waters of Wiesbaden and Rippoldsau, two waters which are known to contain but little, and they omit to notice the stronger and more noteworthy arsenical water of La Bourboule. The seeker after knowledge will have another stumbling-block to surmount should he obtain and read the work on Levico by Dr. Joseph Pacher. He was physician there for upwards of ten years. His small work, which was published at Vienna in 1873, has long been the authentic guide to Levico. At the end of it he gives an analysis of the water made by Professor Manessi, which shows the quantity of arsenic to be not much more than a trace. It is possible, of course, that the later analysis of Professor Barth is the more correct of the two, or it may be that the water tested in each case varied in strength. Either explanation is plausible; but the fact remains that no reader of all the printed documents about Levico and Roncegno can be quite certain what to believe. Having set forth the case as I find it, I may assume that no mineral water now known is stronger in arsenic than that of Levico, and I may add that if the figures I have quoted, which give La Bourboule as containing 28, Roncegno 65, and Levico 90 milligrammes to the litre, are thoroughly trustworthy, then there can be no question as to the fact. Certainly I have learnt enough about the Levico water to admit that it is a remarkable one and well deserving the notice of our chemists and physicians. In Austria no doubt is entertained by those who are competent to form an opinion that this mineral water is noteworthy. The Minister of the Interior sent Dr. Preiss in 1857 to investigate it, and his report was to the effect that few mineral springs were more curious than that of Levico and that the Levico water had great therapeutic power.

The mineral springs in Levico belong to the commune or parish, from which a company has leased them. The weaker spring has always been communal property; the stronger one was acquired from the Dorna family early in the century for a sum equal to £40 sterling; it would not be sold now for £40,000. Neither spring is in Levico itself, both springing from the mountain side at Vitriolo, at an elevation of 4500 feet. At this height a bathing establishment is open for a short time in the year, some patients preferring to drink the water and bathe in it at the source, and at the same time to enjoy the advantage

* Extract from a series of articles on "Austrian Health Resorts" in the *Times*.

of breathing mountain air. Vitriolo is reached from Levico on donkey-back in about three hours. The view from it is extensive and enchanting, yet it is questionable whether any one but a person in search of health would care to spend three weeks at this sequestered and very quiet spot. A medical man resides in the bath-house at Vitriolo during the season. Those who wish for further professional advice must summon a doctor from Levico. For making a special visit the doctor is entitled to a fee of six florins, which seems a very small remuneration considering that at least six hours are spent in ascending and descending the mountain. At Levico, however, this charge is thought high, as the payment for an ordinary visit there is one florin only.

Patients under treatment at Levico are ordered to take baths regularly as well as to drink the water. The bather in the mineral water is said to be invigorated. He certainly experiences a new sensation. Though not under treatment I was permitted to pay the usual charge and to take a bath. This exceptional privilege was granted after I had stated that I was actuated by curiosity and did not mind the risk of bathing in Levico mineral water. The rule is that those who are allowed to bathe at all must bathe a certain number of times, and do so in compliance with the orders of the physician attached to the establishment. The mineral water descends about 4000 feet from its mountain source, and in its progress a marked change takes place in its appearance. When it issues from the ground at Vitriolo it is limpid and colourless; when it enters a bath at Levico it resembles port wine. The mere colour of the water is unimportant; but its astringent properties are not only marked, but they are sometimes painful unless precautions are adopted. Dr. Sartori enjoins upon his patients whose skins are tender and sensitive either to apply vaseline before entering the water or else to bathe in plain water after leaving the bath. If this advice be disregarded then the patients will pay the penalty in the shape of great cutaneous irritation. Thus they will learn by painful experience that Levico water is too strong to be trifled with. Those who drink the water are recommended to exercise moderation. A wineglassful daily of the stronger water is a full dose; a larger quantity of the weaker water may be mixed with wine and imbibed at meals. Dr. Massarellos, who practises in Munich, writes that he is in the habit of prescribing Levico water to his patients, and that they take it along with their beer at dinner and supper. He adds that the beer does not taste any the worse for the addition, and that the action of the water is quite as marked when it is taken in this way as when drunk alone.

The late Dr. Pacher and Dr. Sartori, who has succeeded him as resident physician, both agree as to the way in which the treatment at Levico is to be pursued. Both hold that no one is to begin the "cure" who is not advised to do so by a medical man; in fact, the patient who wishes to be his own doctor finds that he cannot succeed, as the use of the baths is forbidden to those who are unprovided with a medical certificate. At the outset the bath is composed of two-thirds plain and one-third mineral water; towards the end of the course these proportions are reversed, as by that time the body is supposed to be fitted for immersion in mineral water very slightly diluted. The temperature of the water, according to Dr. Pacher, should range from 82° to 86° F.; Dr. Sartori prefers that the temperature should range from 91° to 95°, and both agree that no bather should remain longer than half an hour in the water. With that minute and exasperating attention to detail which is characteristic of German medical men, Dr. Pacher is careful to point out that the patient should ascertain whether the water is at the proper temperature, and that he should do this either by testing it with a thermometer or else by putting his foot in the water and judging by his feelings. He is also copious and wearisome in enforcing the propriety of carefully drying the whole body after leaving the bath, this being a matter which no one, I should think, is likely to neglect. It is possible, however, that unless warned to the contrary, some of Dr. Pacher's patients omitted drying their bodies after stepping out of a bath and before putting on their clothes. Dr. Sartori is equally careful in enjoining upon bathers the necessity of drying themselves, while he further advises, as I have said already, that they should anoint themselves with vaseline before entering the water.

The medical men who have written about Levico water praise it on account of its containing the requisite proportions of iron, copper, and arsenic. As Dr. Massarellos puts it—the arsenic stimulates the secretions, the copper soothes the nerves, the iron strengthens the blood. At Roncegno, where the water has a close general resemblance to that of Levico, the cures wrought are ascribed to its containing, in due proportions, arsenic, iron, and manganese. But little is thought of the copper at Roncegno and as little at Levico of the manganese. At both places the patients are well fed as well as well dosed. Dr. Sartori sagely remarks that the most suitable diet is that which agrees the best with a patient. Writing, not as a patient but as a critic, I should pronounce the food provided at the "Curhaus," where I had the pleasure of making Dr. Sartori's acquaintance, to be too rich for those who have not very good digestions. Perhaps there is nothing more difficult to settle than the appropriate diet for patients at a Continental watering place. So long as they all come from the same country the matter is easy enough; but when people of various nationalities congregate in order to be cured, then the problem becomes serious. At some watering places, such as Marienbad and Carlsbad, where the regimen is half the cure, it has been found necessary to revise the rules laid down many years ago. In the early days of these health resorts their frequenters came from Austria, Germany, and Russia. Of late years they have been frequented by English, Americans, French, and Italians also. Now the food eaten at home by these persons differs as much as the languages spoken by each. The medical man at a watering place should not only be able to speak many tongues, but he should be versed in the domestic habits and the personal constitutions of many peoples. At Levico the necessity for an acquaintance with international medicine has not yet arisen. The majority of the visitors come from Italy, and they are as ready to enjoy the dishes of their native land as they are to speak its language. Few persons in Levico speak or understand German. The visitor who is unversed in Italian will find a difficulty in having his wishes gratified. As yet the polyglot hotel porter who speaks many tongues fluently and imperfectly is an unknown personage in Levico, the visitors being expected to act as their own interpreters.

Dr. Pacher says that the treatment at Levico forms a good "after-cure" for those who have been at a watering place in other parts of Austria. The maladies for which the water is said to be the best adapted are those of which anæmia is the basis or cause, and it is specially suited for the treatment of a large class of female ailments. The proportion of women to men undergoing the cure at Levico is as three to one. At Vitriolo men are in the majority. Delicate children of both sexes derive great benefit from the Levico baths and waters. Dr. Sartori states that the invalids to whom these baths and waters will afford no relief are those suffering from acute fever, from serious heart disease, or who are in an advanced stage of pulmonary consumption. He is most comprehensive, however, in designating the class of persons who should visit Levico for treatment. He advises all who are ailing, but not really ill, to try Levico in order that they may not grow worse, while he is convinced that those who have been ill but are not quite recovered, and that those who are afflicted with some disease of which they wish to get rid, should follow their example.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 5, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SPECTROSCOPE AND ELEMENTARY MATTER.

LITTLE more than a quarter of a century has passed since the researches of KIRCHHOFF practically placed the spectroscope at the disposal of physicists as an instrument by which they were enabled to peer with unprecedented keenness into the composition of matter. During that time numerous additions have been made to the list of "elements" by its aid, without, at present, any signs being manifest that its work in this direction is at an end. Indeed, just as modest discoveries of single elements seem to be giving place to revelations of whole groups by the spectroscope, the announcement is made that the same instrument has been applied to the resolution of matter hitherto supposed to be elementary into still more simple constituents. The "mathematico-spectroscopic" method by which this result has been attained has been described by Professor GRÜNWALD, of Prague, in a communication of which a translation appears in the current number of the *Philosophical Magazine*. As it seems probable that this paper will afford a fresh starting point for spectroscopic work, and have an important influence upon the future of physics and chemistry, it may be interesting to give a general outline of its principal arguments and conclusions, as free as may be possible from the technicalities which in the original are indispensable to the full setting out of the subject to meet the wants of the specialist.

Professor GRÜNWALD commences by laying down a fundamental theorem, which may be paraphrazed as follows:—He assumes that if in any gaseous substance there be a primary chemical element combined with other elements, and occupying a definite volume in the unit volume of the gaseous substance, and if, when that gaseous substance combines with another to form a third, the supposed primary chemical element passes into a different chemical combination with the giving up of heat and consequent contraction of volume (or the reverse), then the relation of the volume which the supposed primary element occupied in a unit volume of the original gaseous substance to the volume which it would occupy in a unit volume of the new compound would generally be in accordance with a known fundamental law of chemistry. In this case, the relation existing between the wave-lengths of all the rays that belong to the supposed primary chemical element in the line spectrum of the original free gaseous body and the wave-lengths of the corresponding rays emitted by the primary chemical element in its new chemical combination would be as the corresponding volumes.

This view of the subject has been applied by Professor GRÜNWALD to the relationships between the line spectra of hydrogen, oxygen, and water-vapour, with the result that he has been led to the inference that hydrogen is a compound substance. In the application of this theorem he states that he has found that the wave-lengths of the elementary line spectrum of hydrogen may be divided into two groups, designated (*a*) and (*b*), the wave-lengths of group (*a*) being convertible into wave-lengths of the water-spectrum by multiplication by the constant 0·6336 (nearly $\frac{19}{30}$), and the wave-lengths of group (*b*) by the constant $\frac{4}{5}$. From this he infers that hydrogen consists of two primary elements, *a* and *b*, of which the one, *a*, produces the group (*a*) under the influence of *b*, and the second, *b*, produces the group (*b*) under the influence of *a*. Then by a simple equation, in which he uses as factors the relative volumes of *a* and *b*, indicated by the constants mentioned before as required to convert their respective wave-lengths into wave-lengths of the water-spectrum, he gets the result that in volume $a=\frac{4}{5}$ and $b=\frac{1}{5}$, and concludes therefrom that hydrogen is a compound of one volume of the primary substance *b* with four volumes of the primary substance *a*, which can be represented by the formula $H=ba_4$. Such a compound, it is pointed out, would be analogous to NH_4. The substance *a*, according to Professor GRÜNWALD, is the lightest of all gaseous substances, being much lighter than hydrogen; and assuming *a* to be a monovalent element, the substance *b*, also gaseous, would be pentavalent, similar to nitrogen. By calculations based upon these data, Professor GRÜNWALD claims to have been able to fully complete the hydrogen spectrum as far as known in the ultra violet portion, and to construct a very complete spectrum of the primary element *b*, and he gives lists of the spectra which he has calculated for the elements (*a*) and (*b*) of hydrogen, side by side with what he considers to be the corresponding FRAUNHOFER and chromosphere lines.

A careful comparison of the lines of the spectrum of the primary element *b* with the corresponding FRAUNHOFER and chromosphere lines, with which they show a remarkable agreement, led to the conclusion that the primary substance *b* must occur in a free state in the sun's atmosphere, and that it is in fact identical with the hitherto unidentified substance that has been named "helium," of which only one ray has yet been recognized. If, however, the primary substance *b* occurs in the sun's atmosphere as the result of dissociation of hydrogen, it would follow from Professor GRÜNWALD'S conclusions that the primary substance *a*

must also be present, as a necessary consequence of the dissociation. But if *a* be the lightest of all gases it would exist in regions of the photosphere that would only be exceptionally reached by the much heavier helium and other elements as a result of powerful eruptions. Such regions would correspond with the extreme portion of the corona, and Professor GRÜNWALD finds in a solitary ray at 1474 of KIRCHHOFF'S scale, or $\lambda = 5315{\cdot}9$ (about) of ANGSTRÖM'S scale, proof of the presence there of *a*, and he therefore proposes to name it "coronium." It may be remarked that the line referred to appears to be a green line in the corona spectrum which has been a source of some perplexity. At first it was thought to be an iron line; but this could not be satisfactorily established. Then Mr. CROOKS suggested it might be due to an element lighter than hydrogen, whilst Professor YOUNG thought it might be attributed to an unknown gas occluded by iron. Lastly, SECCHI suggested that its elucidation would be found in an investigation of the hydrogen spectrum, he having obtained it with GEISSLER tubes containing that gas.

Supposing that in consequence of an eruption the primary elements *a* and *b*, or coronium and helium, were brought into contact with one another in the high and relatively cool regions of the corona, Professor GRÜNWALD thinks that all the conditions would be there for the formation of the modified hydrogen to which he attributes the second compound hydrogen spectrum. Concerning the wave-lengths of this second hydrogen spectrum, which are said to be due to a more complicated structure of hydrogen molecules, he has made the remarkable observation that (after exclusion of the lines belonging to the elementary line spectrum) they may all be converted into corresponding wave-lengths of the water spectrum by multiplying by $\frac{1}{2}$. This is explained as a simple consequence of the fact that the modified hydrogen molecule H′ in H_2O vapour occupies exactly half the volume it occupies in the free condition. Calculations based on this observation enabled Professor GRÜNWALD to predict a large number of hitherto unknown wave-lengths of the water-spectrum, a list of which was sent to Professor LIVEING, of Cambridge, for the purpose of experimentally testing the correctness of the theory. So far as the observations have yet been made, the predictions have been verified in a most satisfactory manner.

The wave-lengths of the elementary line-spectrum of oxygen have also been examined with similar results. It was found that they could be divided into two groups, H′ and O′, the former being identical with the rays of the modified hydrogen just referred to, and the latter being divisible into sub-groups consisting of the primary substance *b* and a third primary substance *c*. To adopt Professor GRÜNWALD'S summary, "Oxygen in its simplest molecular "condition is a compound of the modified hydrogen "H′, which radiates the second so-called compound "line-spectrum of hydrogen, with a substance O′ in "equal volumes without condensation. O′ is a com"pound of four volumes of the pentavalent (nitrogen"like) element *b* of hydrogen in a special condition "of chemical condensation with five volumes of a "substance O″, which itself again consists of four "volumes of the primary element *b* (in one of the "former various chemical conditions) with five "volumes of a new hitherto unknown primary sub"stance *c*."

Nitrogen has as yet been only partially investigated, but it has been ascertained that in its simplest chemical condition it resembles oxygen in being a compound of the modified hydrogen H′ with a substance N′ in equal volumes without condensation, and that N′ has a large group of constituents in common with oxygen. In carbon, also, the existence has been established of the primary substance *b* in at least two chemical conditions, as well as of the primary substance *c* which is contained in oxygen.

It may be added, in conclusion, that although the fundamental law was originally obtained only for compounds of primary elements, it also holds very nearly for compounds of what it would seem must now be considered compound radicals, so far as these really behave as atoms. An instance of this is the fact that the wave-lengths of all the hydrogen and oxygen rays, if multiplied by $\frac{2}{3}$ (the mean condensation factor of H and O upon their combining to H_2O), are converted into the wave-lengths of corresponding H_2O rays, at least so far as the H_2O spectrum is known.

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, at 17, Bloomsbury Square, when papers will be read entitled "The Alkaloidal Value of Ipecacuanha Cultivated in India," by Mr. F. Ransom, and "Notes on Trebizonde Honey," by Dr. Thresh. The chair will be taken at 8 o'clock precisely, but the Theatre will be open an hour previously to allow of the inspection of specimens and apparatus exhibited.

* * *

A meeting of the subscribers to the local fund of the British Pharmaceutical Conference was held in the Memorial Hall, Manchester, on Wednesday, October 26, to consider the best means of disposing of the balance in hand. It was unanimously resolved that a donation of ten guineas be made to the Benevolent Fund of the Pharmaceutical Society, and that the remainder (about £30) be given to the Library Fund of the Manchester Pharmaceutical Association. A suggestion was made that the books purchased therewith should bear a suitable inscription to render them a permanent record of the very successful visit of the Conference.

* * *

Mr. Dott writes in reference to the note which appeared in the last "Month" on the difference in the reactions between morphine salts and amyl nitrite, and takes exception to the suggestion that under the conditions then spoken of, morphine acetate shows greater stability than the hydrochlorate. Mr. Dott thinks the phenomena in question are not to be ascribed to the acetate being in any sense a more stable salt than the hydrochlorate, but that they are susceptible of a simple explanation in the following manner:—In the first place, amyl nitrite in contact with water gradually decomposes with formation of nitrous and nitric acids. Should the ether contain any higher oxides of nitrogen in solution it will, of course, render water strongly acid when agitated with it. Secondly, the morphine hydrochlorate of commerce is either neutral or faintly acid, while the acetate is almost

invariably basic, and often contains a good deal of free morphine. Consequently when morphine acetate is used in the manner described the nitric and nitrous acids present in solution would be neutralized by the free morphine, but in the case of the hydrochlorate they would remain free to exercise an oxidizing influence. Further, if after filtration of the mixture containing morphine acetate a small additional amount of nitrous and nitric acids should be slowly formed, the acids thus produced would doubtless combine with some of the morphine and liberate acetic acid. In the other case, however, where hydrochlorate was used, these nitrogen acids would not decompose that salt itself, but would remain free, and in that state would attack the morphine of the hydrochlorate with production of the red coloured nitroso-morphine compound. Hence Mr. Dott considers that the superior stability of the acetate in the circumstances mentioned is only apparent, and is in reality due to its ready decomposability. All this is indeed quite correct as a detailed explanation of the facts in question from a strictly chemical point of view, but it only applies to the morphine salt as a salt. That, however, was not the only or even the chief view of the matter under which the note was written in the "Month." In dispensing amyl nitrite with morphine hydrochlorate there was an alteration of the morphine accompanied by the formation of a red coloured product, which at least made the mixture unsightly, and also gave rise to doubts whether it had been accurately dispensed. When the acetate was used there was no such alteration of the morphine; it was in fact the salt in which morphine was least liable to alteration, and that, from the medicinal point of view, is the most important consideration, one which we think so far justifies the suggestion that under the conditions mentioned morphine acetate shows greater stability than the hydrochlorate. How this happens Mr. Dott has explained chemically.

* * *

The *Medical Press and Circular* "understands" that the Court of Directors of the Apothecaries' Hall of Ireland contemplates the establishment of a School of Pharmacy.

* * *

The opening meeting of the School of Pharmacy Students' Association will take place on Thursday, November 10, when an address will be delivered by Mr. G. F. Schacht, and the officers for the ensuing session will be elected. The chair will be taken by Professor Attfield, F.R.S., at 7 p.m.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held in the rooms of the Chemical Society, Burlington House, on Monday evening next, at 8 p.m., when a paper will be read on the "Comparative Antiseptic Action of Chlorides, Nitrates and Sulphates," by Mr. C. T. Kingzett.

* * *

The monthly evening meetings of the Sheffield Pharmaceutical and Chemical Society will commence on Wednesday next, the 9th inst., at 8.30, with a lecture on "The Periodic Law applied to the Study of Chemistry," by Mr. J. H. Worrall.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday, November 10, when a paper will be read on "Emulsions," by Mr. A. W. Gerrard, F.C.S.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 2, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Evans, Greenish, Hampson, Hills, Newsholme, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Woolley.

The minutes of the previous meeting were read and confirmed.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society:—

Carter, Henry Lansdale.
Collett, William James.
Miner, Major Thomas.
Williams, Joshua Edward.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Carter, Henry Lansdale .....London.
Collett, William James .....Nantwich.
Miner, Major Thomas.. .....Walsall.

ASSOCIATES.

The following, having passed the Minor examination and paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Arnold, Walter.....Wolverhampton.
Bainbridge, John ....Kirkby Stephen.
Barber, Daniel Stone .....Dursley.
Batchelor, William .....Stalybridge.
Beanland, John Milner .....Keighley.
Bennet, Andrew Russell.....Uphall.
Billington, Herbert Bennett ...Barnsley.
Bird, John .....Manchester.
Birkett, George .....Morecambe.
Blewett, William Thomas .....Penzance.
Boole, Lucy Everest .....London.
Coley, Robert ....Melton Mowbray.
Cotton, James Charles .....St. Helens.
Downes, William Francis .....Wilmslow.
Dunn, Edward Bertram .....London.
Dunn, John Henry .....Hull.
Evans, Frederic Ernest .....Lymm.
Everett, John Garwood .....Ipswich.
Fardon, Arthur Edwin .....Bristol.
Gale, William Gillam ..... Worksop.
Golden, Alfred Percival .....Leicester.
Golds, Lewis George .....Steyning.
Hart, Frank .....Bolton.
Heald, Alfred Francis.....Burnham.
Hickmott, Albert Ernest .....London.
Hislop, James Andrew .....Hawick.
Horne, George Herbert ..... Scarborough.
Ingle, George .....Bradford.
Jennings, John Atkinson .....Natland.
Jessop, Sam .....Brighouse.
Jones, Edwin Pryce .....Aberdare.
Kent, Wm. Henry Plaisted ...East Molesey.
Limbrick, James Alfred.....London.
Newbould, Victor Emanuel ...Sutton.
Polack, Emanuel .....Rochester.

Plumbly, Walter .....Norwood.
Rees, William .....Pontardawe.
Smith, Arthur .....Watford.
Tree, Frederick .....St. Leonards.
Wallbridge, John George .....Liverpool.
White, Edmund .....Rochester.
Whiteley, John William.....Gainsborough.
Wilkinson, Charles Edward ...Bridgnorth.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Roberts, Campbell Clement ...Thornbury.
Southall, John Edmund .....Birmingham.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee, ordering the payment of sundry accounts, were received and adopted, on the motion of the President. He stated that the subscriptions to the Benevolent Fund had been coming in very well. As he had mentioned last month, although donations were always welcome, and were permanently useful, they were, under the Bye-laws, obliged to be invested, and the interest only could be applied in relieving distress. Subscriptions, however, could be directly so applied, and it was therefore of the greatest importance that this source of income should be kept up. He also explained some of the items in the expenditure for repairs and decoration of the premises.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 42) of a registered chemist and druggist, whose husband had several grants, amounting to £25, previous to his death in February last. Applicant is in ill-health. (Yorks).

£5 to a registered chemist and druggist (aged 59), unable to earn anything from defective sight. (Lancs).

£5 to the widow of an associate from 1882 to 1887. This case was before the Committee in October, when it was not entertained, but was now reconsidered with further information.

Three other applications the Committee had declined to entertain.

The Vice-President moved the adoption of the report and recommendations.

Mr. Robbins said he had just had a cheque from Manchester, being a portion of the surplus from the guarantee fund raised in Manchester for the entertainment of the British Pharmaceutical Conference. The letter from Mr. Woolley accompanying it did not say whether it was a subscription or donation, so he instructed the Secretary to enter it as a subscription, because by that means the Committee would have the immediate use of the money; whereas, if it were put down as a donation it would have to be locked up. He hoped others who might be thinking of sending in contributions would take this hint.

Mr. Schacht asked if it would not be possible to modify the bye-law.

The President thought the bye-law might be reconsidered when the time came.

Mr. Richardson said the rule was to invest any surplus from the subscriptions at the end of the year, and he thought that was rather a mistake.

The President said it was rather awkward sometimes, because when subscriptions were once invested they could not be got at again. The bye-law was a good one, so far as donations went, but it seemed hard when subscriptions, which were not wanted at the moment, were invested, that they could not be withdrawn subsequently if special occasion required.

Mr. Richardson suggested that there might be two banking accounts, one for subscriptions and the other for the funded property.

Mr. Schacht suggested that it was quite open to anyone desiring to give, say, £100 to the Fund, to direct that any portion of it should be applied to current expenses.

The President said if that portion were termed a subscription it would be all right. It was a recognized rule in most societies that donations should be invested, which was only departed from under special circumstances.

Mr. Woolley said he purposely worded the letter sending the cheque, so that the Committee might deal with the money as it wished.

Mr. Bottle pointed out that the investment of surplus subscriptions was not compulsory, but optional.

Mr. Richardson said it had been the general practice. He thought any surplus should be held over for a time to see if it was wanted.

Mr. Hampson asked if the subscriptions were coming in satisfactorily.

The Secretary said £167 had been received during the month.

Mr. Robbins said there would be great inconvenience in having two banking accounts. The custom had been, if there was a surplus of, say, between £400 and £500 on the subscriptions, and if there were funds in hand, to invest a round sum of £500. He thought in future the Council would be more careful that subscriptions were not invested until there was a good balance in hand.

The President, in answer to Mr. Southall, said the investments were made by order of the Council, on the recommendation of the Committee. He thought Mr. Richardson's suggestion might well be considered in future, when there happened to be a surplus, and probably the best way would be to keep it on deposit, so that it might be available for use if there were any unusual amount of distress. It would be some time, however, before the Fund was in that position. The Council was grateful to the friends of the Fund for their efforts, and no doubt the unusual expenditure this year in giving an extra gratuity to the annuitants would meet with general approval.

The report and recommendations were then adopted unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
July	Day	437	32	3	17
	Evening	97	12	0	5
August	Day	42	10	0	2
September	Day	60	10	0	4

Circulation of books.	Town.	Country.	Total.	Carriage paid.
July	99	105	204	£1 4 11
August	44	70	114	1 2 10½
September	37	80	117	1 1 5

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Glasgow University, Calendar, 1887.
From the University.
University College, Dundee, Calendar, 1887.
From the College.
University College, London, Calendar, 1887.
From the College.

Mason Science College, Birmingham, Calendar, 1887. From the COLLEGE.
Owens College, Manchester, Calendar, 1887. From the COLLEGE.
Yorkshire College, Annual Report, 1887. From the COLLEGE.
City of London College, Calendar, 1887. From the COLLEGE.
Royal College of Surgeons of England, Calendar, 1887. From the COLLEGE.
Institution of Civil Engineers, Charter, By-laws, and List of Members, 1887. From the INSTITUTION.
Hospitals Association, Annual Report, 1887. From the ASSOCIATION.
Massachusetts State Pharmaceutical Association, Proceedings, 1887. From the ASSOCIATION.
Massachusetts College of Pharmacy, Annual Catalogue, 1887. From the COLLEGE.
New York State Pharmaceutical Association, Proceedings, 1887. From the ASSOCIATION.
Alumni Association of the Philadelphia College of Pharmacy, Annual Report, 1887. From the ASSOCIATION.
Abbott, (Helen C. de S.), Plant Analysis as an applied science, 1887.
— Plant Chemistry as illustrated in the production of sugar from Sorghum, 1887. From the AUTHOR.
Méhu (C.), Dosage de l'urée des urines albumineuses par les hypobromites alcalins.
— Note sur l'ivoire végétal ou corozo. From the AUTHOR.
Flückiger (F. A.), Italienische Beiträge zur Geschichte der Pharmacie und Botanik, 1887.
— Bemerkungen über die Verbreitung des Berberins, 1887.
— & E. Schär, Strychnos Ignatii, 1887. From Professor FLÜCKIGER.
Lojander (H.), Beiträge zur Kenntnis des Drachenblutes, 1887. From the AUTHOR.
Swieżawski (E. S.) & K. Wenda, Materyjaly do dziejów farmacyi w dawnej Polsce, etc., część 3, 1887. From Mons. WENDA.
The Therapeutical Value of the more recent additions to the Genito-Urinary Pharmacopœia, 1887. From the AUTHOR.
Paschkis (H). & T. Zerner, jun., Zur Kenntniss der Strophanthinwirkung, 1887. From Dr. PASCHKIS.
Kaiserliche Leopoldinisch-Carolinische Deutsche Akademie der Naturforscher, Nova Acta, 1865-87. From the AKADEMIE.

For the Library in Edinburgh—

New South Wales, Technological Museum, Report, 1886. From the MUSEUM.
Smithsonian Institution, Report, 1885, part 1. From the INSTITUTION.

The Committee recommended that the undermentioned books should be purchased :—

For the Library in London—

Annals of Botany, in parts as published.
Tidy (C. M.), Handbook of Modern Chemistry, 2nd edition, 1887.
Lunge (G.), Coal-Tar and Ammonia, 1887.
Battershall (J. P.), Food Adulteration and its Detection, 1887.
Behrens (J. W.), The Microscope in Botany, 1885.
Charles (T. C.), Elements of Physiological and Pathological Chemistry, 1884.
Whitla (W.), Elements of Pharmacy, 4th ed., 1887.
Bower (F. O.) and S. H. Vines, Course of Instruction in Practical Botany, part 2, 1887.
Dittmar (W.), Exercises in Quantitative Chemical Analysis, with Treatise on Gas Analysis, 1887.
Pappe (L.), Floræ Capensis Medicæ Prodromus 3rd ed., 1868.
Balfour (J. H.), Description of the Plant which produces the Ordeal Bean of Calabar, 1860.
— Description of Asafœtida Plants, 1860.
Schmidl (M.), On the Constitution of Oil of Cajeput 1860.
Cole's Studies in Microscopical Science, Botanica Histology.
Hetley (Mrs. Charles), The Native Flowers of New Zealand.
Nickels (B.), Coal Tar Tree, mounted.

The Librarian had also reported that at the annual inspection of the library the undermentioned books were missing :—

Annalen der Chemie, Bd. 117–20.
Annalen der Chemie, Bd. 213–16.
Art of Dispensing, 2 *copies.*
Bell, Analysis of Food, vol. 2.
Bentley, Organic Materia Medica.
British Pharmacopœia, 1885.
Davies, Microscopic Mounting.
French Codex, 1866.
Pharmaceutical Register, 1881.
Pharmaceutical Register, 1886.
Wills, Practical Botany.

The Librarian had presented his report of the annual meeting of the Library Association at Birmingham.

The Committee recommended that the Society's publications be presented to the Technological Museum at Sydney, New South Wales.

Museum.

The Curator's report had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
July	Morning .	418	27	3	16
	Evening .	106	12	2	4

The attendance during August had been 29, and during September 110, or an average of 7 during each day that the Museum was open.

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

To the Museum—

Specimen of pure oil of *Pinus sylvestris.* From Dr. A. H. WOOD.
Bark of *Michelia nilagirica.* From Messrs. JENKIN and PHILLIPS.
Specimen of kiku oil from the leaves, and another obtained from the flowers of a Japanese plant. From Messrs. SCHIMMEL and Co., Leipzic.
Specimen of *Strychnos colubrina.* From Dr. TRIMEN, Ceylon.
Specimens of cryptopine, crystalline and in powder, and of the picrate, bitartrate, hydrochlorate, binoxalate, meconate and dichromate of the same alkaloid.
Specimen of hydrochlorate of thebenine. From Messrs. J. A. WINK and Co.
Specimen of *Mylabris bifasciata, M. lunulata,* and cantharidin obtained from the former. From Messrs. WRIGHT, LAYMAN and UMNEY.
Twenty specimens of Indian drugs. From Dr. DYMOCK.
Specimens of antipyrin, betol and salol. From Mr. H. HELBING.
Specimens of pyridin, naphthalin, methylal, β-naphthol, antifebrin, amylene hydrate, hypnone, aseptol, eucalyptol, terebene, paraldehyd, resorcin. From Messrs. E. MERCK, Darmstadt.
Specimen of *Ansellia nilotica* from Mozambique (used in asthma). From Mr. TUGMAN.
Specimen of *Gleditschia triacanthos.* From Mr. J. W. NAYLER, Jersey City, U.S.A.

Specimen of oil of asafœtida.
From Mr. J. S. WARD.
Sixteen specimens of herbs, roots, etc.
From Messrs. POTTER and CLARKE.
Five samples of cubebs.
From Mr. J. HARTFORD, New York.
Specimen of *Ophelia alata*.
From Mr. W. ELBORNE.
Specimens of logwood and fluid extract prepared from the unfermented wood.
From Mr. L. SIEBOLD, Manchester.
Specimen of Saccharin and of the oil of *Pinus Pumilio*.
From Messrs. BURROUGHS and WELLCOME.
Specimen of the wood of *Cinnamomum Camphora* and *Litsœa citrata*. From Dr. BIDIE, Madras.

To the Herbarium—

Specimens of *Carex pulla*, *C. lagopina*, *Luzula arcuata*, *Goodyera repens*, *Malaxis paludosa*, *Melampyrum pratense*, var. *hians*, *Trifolium repens*, *Drosera obovata*, *Arabis petræa*.
From Mr. G. C. DRUCE, Oxford.
Specimens of one hundred British flowering plants, and specimens of *Leeanora tartarea*.
From Mr. W. WEST, Bradford.
Specimens of *Rhamnus Purshianus*.
From Mr. J. HARTFORD.
Twenty-six specimens of Indian medicinal plants.
From Mr. J. G. PREBBLE, Bombay.

In consequence of a letter from Messrs. Churchill, the Committee recommended that a copy of the Journal for February 25, 1888, having special reference to the Benevolent Fund, be sent to every person on the Register.

The members of the Staff of the Society's School had reported the entries in their respective classes, which showed a larger number than usual of entries for the whole session.

In pursuance of instructions from the Council, the Committee had considered the best means for increasing the facilities for teaching Practical Pharmacy in the Society's school. Mr. Ince had attended the Committee, and after a long discussion the further consideration of the subject had been adjourned.

The Committee recommended the purchase of twelve microscopes for the use of students in the Botany and Materia Medica classes.

At an adjourned meeting, the Committee had agreed to recommend that Messrs. Butler and Tanner be employed to print the Register and Calendar, that the price of the Calendar be 2*s*., that booksellers be allowed the usual trade discount, and that the postage be paid by the Society of copies purchased by members, associates and apprentices. Also that certain alterations be made in the list of certificates received in lieu of the Society's Preliminary examination from the Universities of Edinburgh, Glasgow, Aberdeen and St. Andrews, and that certain verbal alterations be made in the syllabus of the Preliminary examination on the subject of Latin.

A letter had been received from Professor Green, enclosing a list of the apparatus he wished to be supplied with, and the Committee recommended that the request be acceded to.

A letter from Professor Dunstan had also been received, calling attention to the present state of the chemical and physical apparatus, and the necessity for the purchase of certain chemicals and materials. The Committee recommended that a sum not exceeding £35 be expended in completing the chemical apparatus, etc., and a sum not exceeding £30 for the purchase of additional physical apparatus, etc., to illustrate the subjects of heat, light, electricity, and magnetism; also that certain additions to the stock of chemical specimens for use in demonstrating the lectures be made at a cost of not more than £20. The materials consumed to be provided by the Professor.

The Committee also recommended that a list of the Society's apparatus be prepared, and a report as to its condition made to the Committee at the end of each session. The question of increasing the facilities for teaching Practical Pharmacy had been further considered and again adjourned.

The Council went into committee whilst the President explained in more detail some of the recommendations with regard to the apparatus, etc., proposed to be supplied to the Professors.

On resuming—

Mr. SYMES said it had occurred to him when he was recently at Sheffield, and saw the useful work which was being done there, how desirable it was that such work should be extended; and he thought it would be well if the Council could be kept more in touch with the organizations in various parts of the country. He thought this might be accomplished by asking all the Local Secretaries to send in a report once or twice a year, and perhaps it would be well if a series of questions were sent round asking what was being done in the way of education, etc. This might encourage other centres to do the same good work as was being accomplished in Sheffield.

The PRESIDENT thought something might be done in the way suggested.

Mr. RICHARDSON said the Local Secretaries were frequently not connected with these provincial schools of pharmacy. There had been a doleful tale recently from one large centre, where it was feared they would not be able to keep the school going. He did not know whether prospects had improved in that particular locality, but he was glad to see that the schools in the provinces were making very great progress generally; the one at Leicester was doing very well at a very small expense, and he agreed in the suggestion made by Mr. Symes, only he thought the question should be addressed to the secretaries of these schools rather than to Local Secretaries.

Mr. BOTTLE suggested that this discussion was not quite in order on the question before the Council.

Mr. RICHARDSON said he was glad to see that fire ladders had been provided on the roof, and suggested that fire drill should occasionally take place under the direction of a fireman, so as to avoid the risk of panic in case of accident.

The PRESIDENT, in moving the adoption of the report, called attention to various portions of it. The special issue of the Journal was resolved upon some years ago, subject to the date being fixed by the Committee, which had now been done, and he hoped the result would be a large increase of subscriptions to set off against the applications for relief, which were always found to follow the issue of the special number. The question of teaching practical pharmacy was still under consideration, and would be reported upon later. The Society was bound by the Act of Parliament to publish the Register annually. and it cost a good deal to produce; but the purchase of a certain number of copies by Government departments nearly recouped the expenditure. The Society undertook, when it obtained the Pharmacy Act, to keep this Register, and it incurred a considerable annual expense in keeping a register for the benefit of all chemists and druggists, many of whom subscribed nothing whatever. The alterations in the syllabus were purely verbal, and were introduced at the suggestion of the College of Preceptors to correct an oversight which had previously escaped notice. With regard to the certificates also, there was no real change, the alterations being merely formal. It was proposed that the Professors should be equipped with some additional apparatus for the better illustration of the lectures, the progress made in the subjects of heat, light, electricity, magnetism, and chemistry necessitating from time to time additions of this nature. One of the objects aimed at was to show experiments to students, not merely to have a lecture read to them, as was the case in some schools; but this was necessarily a little costly. There had not

been any serious addition to the apparatus in this department for a good many years, and consequently there was a large gap to fill up. No doubt from time to time it would be necessary to make further additions, but that would not be a serious matter. With regard to the microscopes it was proposed by the Professor of Botany to exhibit certain structures in a practical way to his class, and it was felt by the Committee that he ought to be encouraged in this endeavour, to relieve the dryness of the subject, and make it more attractive as well as more useful.

Mr. ALLEN drew attention to the alteration in the price of the Calendar. The cost was more than 2*s.*; the number of sales at 1*s.* had always been limited, and it was considered that if booksellers were allowed a profit on the sale there would be a prospect of more being distributed. The Calendar was so full of information that it seemed to him very desirable that it should be in the possession of every one connected with the Society, and he hoped in the next year the sales would be largely increased. If this were the case there would not be so many queries sent to the editor or officers of the Society, for many of them could be answered at once by reference to the Calendar.

Mr. BOTTLE failed to see how a larger sale at 2*s.* could be expected than had been obtained at 1*s.*, and even if it entailed some expense he considered the circulation of the Calendar was a legitimate and dignified mode of advertising the Society.

Mr. SAVAGE said the feeling was that the sale was interfered with by booksellers not being allowed a profit.

The PRESIDENT said the object was rather to facilitate its distribution than increase the sale, because at present booksellers refused to procure them. The price of 2*s.* would compare favourably with that of similar publications, and the larger number being distributed gratis, it was not anticipated that much difference in the gross receipts would be made.

The SECRETARY remarked that sometimes booksellers sent to the office for the Calendar, but when they found there was no discount they would not take it.

Mr. RICHARDSON suggested that the Calendar might be made more popular, and contain advertisements, like the Medical Directory.

The PRESIDENT said the Medical Directory was not an official publication.

Mr. RICHARDSON said the publishers of the Journal might take it up, the Society not being obliged to publish it, and might make it a complete directory of chemists and druggists.

The PRESIDENT said it did not profess to be that; it was the Calendar of the Society.

The VICE-PRESIDENT feared that a great many persons did not appreciate the value of the Calendar, one of the greatest merits of which was that it contained so many Acts of Parliament which concerned the trade.

In reply to an inquiry, the SECRETARY said only about two hundred out of the nine hundred which were printed were sold.

The PRESIDENT remarked that schoolmasters and teachers often purchased the Calendar to see the character of the examinations, and he did not see why they should obtain a book which cost 2*s.* 6*d.* at a less price than 2*s.*

The motion was then put and carried unanimously.

Mr. SYMES, referring to the matter he had previously mentioned, pointed out that the Local Secretaries were the only gentlemen whom, as he thought, the Council could recognize. He wanted to get information from all quarters, not only from places where there were successful schools. He would move that the Committee be requested to consider the matter, and make some arrangements by which the Council could be kept more closely in touch with the Local Secretaries.

Mr. BOTTLE seconded the motion.

Mr. SOUTHALL asked if the Local Secretaries would be obliged to report. His experience was that these schools fluctuated, and when they were in a depressed state they would rather not report, but leave it to those who were for the time being more flourishing.

Mr. SYMES thought a report from a school which was in a low state would be one means of raising it.

Mr. ATKINS thought Mr. Symes would be disappointed if he expected all the Local Secretaries to send in reports as to the state of pharmacy in their districts, though they might send in replies to a series of questions. He wished most decidedly to support the remark which had been made about the wisdom of the President visiting local associations, and would suggest to such associations throughout the kingdom that they should invite the President to visit them, and to the Council that it should warmly support the President in acceding to such invitations. He knew nothing likely to do more good than for a man who thoroughly knew the working of the Society to visit various parts of the kingdom, and remove the prejudices which sometimes existed, arising merely from ignorance.

Mr. NEWSHOLME strongly supported the last suggestion. The President's visit to Sheffield brought a number of people together who were not connected with the Society at all, and the opportunity of hearing a clear statement of what the Pharmaceutical Society could do and could not do did an immense deal of good. He felt certain that next year there would be a large accession to the strength of the Society from Sheffield and the neighbourhood.

Mr. RICHARDSON also concurred in this suggestion, which was only following out what was done in former times when Jacob Bell went all round the country and raised the enthusiasm of the local chemists and druggists. He should certainly take care that the President was invited to visit Leicester next year.

Mr. RADLEY said that if this suggestion were followed, it would be only right that the President's travelling expenses should be paid by the Society.

Shortly afterwards Mr. SYMES submitted his motion in the following form:—

> "That with a view to promoting the interests of those engaged in pharmacy and pharmaceutical education in the provinces, the Library, Museum, Laboratory, and House Committee be requested to consider the best means of accomplishing this object, either by inviting Local Secretaries to furnish annual reports or otherwise."

Mr. HAMPSON said there were already rules with reference to granting aid to provincial education, and he scarcely thought it necessary to pass a resolution in this form.

Mr. SYMES said Mr. Bottle, who seconded the motion, suggested that he should make it as broad as possible, and he had endeavoured to do so. He at first thought it would be better to frame a series of questions to which answers might be requested; but if the questions were confined to education, they would be inapplicable to many places from which it might yet be desirable to obtain reports. If when the Committee brought up its report, the Council thought it wise to confine the questions purely to educational matters, well and good.

Mr. ALLEN said he should distinctly object to the educational matter only being dealt with. The Council must give the Local Secretaries—some of whom sat round that table—credit for knowing what they were about, and not tie them down too narrowly.

Mr. HAMPSON explained that he wished the motion to be as comprehensive as possible—not confined to education.

Mr. GREENISH suggested that this being a very important matter, notice of motion should be given, and then the members would come prepared to discuss it.

The VICE-PRESIDENT concurred in this suggestion.

The PRESIDENT said unless it was the general wish that notice should be given, he should rule that it was

not necessary in this case. The Council could not be committed to anything it might afterwards regret by accepting this motion.

The motion was then agreed to.

Mr. EVANS asked if any idea could be given as to the annual expense of the Research Laboratory. Was there any definite scheme?

The PRESIDENT said the scheme with regard to the expenditure had not yet come before the Council. There was a draft scheme which had been referred back, and would probably come before the Committee at its next meeting.

Mr. EVANS said he understood the whole of the top floor of the new building would be devoted to the Research Laboratory, and if so, he thought there must be some scheme.

Mr. ALLEN said the scheme, so far as it had gone, would, he believed, be found in the Journal for March, 1886.

BUILDING.

This Committee had held two meetings. At the first meeting, after consultation with the architect, it was suggested that the new building be allotted as follows:—

1. The four top rooms to be devoted to research work: the two large rooms to be used as laboratories; one of the others to be used by the Director, and the other as a balance and store room.

2. On the next floor, one room to be used as a botanical laboratory, and the other as a waiting room for candidates for examination.

3. The ground floor to be used for examination purposes.

4. The disposal of the basement was deferred.

At the subsequent meeting, the Committee had inspected the new building, and examined the drawings submitted for the fittings of the rooms on the ground floor, with regard to which it had consulted two members of the Board of Examiners. Some alterations having been made it was recommended that this work be proceeded with under the direction of the Committee. Also, that a further sum, not exceeding £500, be paid to the contractors during the current month on the architect's certificate.

The PRESIDENT, in moving the adoption of the report and recommendations, explained in detail the use proposed to be made of the various rooms. The one on the right of the examination hall would be used for the same purpose as the octagon laboratory at present, viz., for an examiner's chemical laboratory, and the one on the left for a dispensary, and possibly for any experiments in practical pharmacy which might by-and-by be brought forward. In the chemical laboratory there would be room for eight students to work, and the amount of fitting required was very trifling. In the dispensary it was proposed to make arrangements for testing twelve candidates at a time, and benches for that purpose would have to be provided. In this matter the Committee had been assisted by two members of the Board of Examiners, who proposed a plan which the Committee thought might be modified with advantage, and it proposed to have a conference with them on the subject. The main object was to secure convenient ingress and egress, and next to make the place as much like an ordinary dispensing establishment as possible. If these recommendations were carried out, the examinations in the new building would be all carried on on one floor and in communication with the Board as a whole. Of course, as a rule, a chemical laboratory was best at the top of a house; but it was thought that this room could be ventilated sufficiently for the purposes of an examination laboratory. There was no room available on the ground floor as a waiting-room, and for the moment the Committee thought the room above the chemical laboratory would do for that purpose; it merely involved furnishing the room, not fitting it in any special way. His impression was that the hall itself could be made to afford accommodation for candidates in waiting, and that this room, if required for any other purpose, would be available. The room over the dispensary it was proposed to leave for the use of the Professor of Botany and his more advanced pupils, or perhaps the whole of them; and probably in that room would be conducted the demonstrations referred to in the report of the Library Committee. The only practical recommendations which involved anything being done immediately were those dealing with the examination rooms on the ground floor.

Mr. EVANS wished to know whether adopting the recommendations committed the Council to allotting the four rooms at the top to the research laboratory. If so, he should move that that portion be omitted, because he did not think it right to pledge the Council so far until the question of the pharmaceutical laboratory, which was now before the Committee, had been decided.

The PRESIDENT said there was a large basement, the front of which was very well lighted, which was unallotted at present, and there was also a possibility of using the octagon laboratory. All that had been deferred until the Committee had decided whether or not there should be a pharmaceutical laboratory.

Mr. SCHACHT thought if the recommendations pledged the Council absolutely to the proposed allocation of the rooms on the top floor it would be well to modify it.

Mr. RICHARDSON remarked that any resolution now passed could be rescinded at any future time.

The PRESIDENT said the Committee would take care that nothing should be done which would prevent a pharmaceutical laboratory being established for want of space.

Mr. EVANS thought the basement would be a very inconvenient place for such a laboratory, and that it ought to have the first consideration.

The PRESIDENT said the Committee had inspected the building, and thought it would be quite practicable to make a laboratory there.

Mr. RICHARDSON said he quite approved of a pharmaceutical laboratory, but he did not take such an expensive view of the matter as some. His own idea was, not that every student should have a place to himself to work on extracts and infusions, but that the demonstrator in pharmacy should conduct experiments before the students. This could be practically carried out at a small expense. He hoped this would not be pushed forward hastily, so that it might become hereafter necessary to undo what was now being done.

Mr. SYMES said his view was that although the basement was not exactly the place one would have built on purpose, it was still the best in the building for the purpose of a pharmaceutical laboratory, even if the top rooms were at disposal. The motion now submitted might be passed without in any way interfering with the prospects of the pharmaceutical laboratory.

Mr. ATKINS asked if there was in reality anything definitely fixed beyond the examination hall.

The PRESIDENT: Yes; the examiners' laboratory and dispensary. The Committee only asked the sanction of the Council to the fitting up of those two rooms on the ground floor.

Mr. EVANS thought the motion had better be confined to that, and leave the rest of the space unallotted until the Committee had drawn up a more definite scheme, and knew what it would be required to spend upon it.

Mr. HILLS said the Council had passed a resolution that it was advisable to establish a research laboratory, and it had been always understood that that was the ultimate purpose of these top rooms. He hoped the whole question was not going to be raised again. Did he understand that if the suggestion were not accepted, the Building Committee were to do nothing, or was it to wait only until the subject could be dealt with financially. He quite agreed that it might be necessary to leave the rooms unfitted for some time, but after the discussions

which had taken place the Council might fairly resolve that these rooms should be devoted to that purpose.

The PRESIDENT said that was all the Committee meant by its report.

Mr. SCHACHT said he only wished to prevent the necessity of hereafter rescinding a resolution if the recommendations of to-day were afterwards modified. He understood the Committee only required powers to equip the ground floor, and he thought it would be better to endorse only what the Committee was clear about, and leave the rest to the future.

The VICE-PRESIDENT said the matter had been thoroughly discussed, and the plans were materially altered for the express purpose of placing the research laboratory at the top.

The PRESIDENT said Mr. Schacht was technically quite right. The Committee had already been authorized to erect and equip a research laboratory, but when the detailed plans were ready, the subject would have to come before the Council again.

Mr. ROBBINS said the financial question would have to come forward before long. Which should be undertaken first, the research laboratory or the pharmaceutical? for he was quite certain there would not be funds enough to carry out both immediately.

Mr. WOOLLEY thought the consideration just put forward by the Treasurer was a reason for reconsidering the whole matter, and deciding which should be undertaken first.

The PRESIDENT said the scheme for the research laboratory in all its details would be coming on again in a month or two, and probably by that time the question of the pharmaceutical laboratory would also be determined. Meanwhile, he would suggest that the motion be accepted, with the following addition :—

"That the allotment of the new building be deferred, with the exception of the ground floor."

In this form the motion was passed unanimously.

REPORT OF EXAMINATIONS.

October, 1887.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (19th)	9	4	5
Minor (19th)	22	13	9
„ (20th)	30	13	17
„ (21st)	28	14	14
„ (26th)	30	17	13
„ (27th)	28	12	16
	—138	—69	—69
	147	73	74

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Minor (18th)	13	6	7
„ (19th)	11	8	3
„ (20th)	13	4	9
„ (21st)	12	7	5
	—49	—25	—24

Preliminary Examination.

	Candidates.		
	Examined.	Passed.	Failed.
11th . . .	290	151	139

18 certificates were received in lieu of the Society's Examination.

THE EXAMINATIONS.

Mr. ATKINS said there was an impression in one of the schools in London, that after Christmas the Minor examination would occupy two days. He was quite satisfied it was a mistake, but it would be as well for it to be contradicted publicly.

The PRESIDENT said it was not the fact that any alteration would be made in the examinations at Christmas. If any alteration were made at any time it would have to come before the Council, and long notice would be given to all concerned.

GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor as to cases placed in his hands.

Alfred Baker, jun., 273, Regent Street, W.,

had paid into Court the two penalties sued for, viz., for keeping open shop for the sale of poison, and for using the title of chemist, together with costs.

J. M. Rhodes, Penge Lane, S.E.,

had paid a penalty and nominal costs for using the title of chemist.

The Committee had considered seven other cases of alleged infringement of the Act, and recommended that they all be placed in the hands of the Solicitor for proceedings to be taken.

On the motion of the President the report and recommendations were adopted unanimously.

CHEMISTS' ASSISTANTS' ASSOCIATION AND THE RESEARCH LABORATORY.

A letter was read from the Honorary Secretary of the Chemists' Assistants' Association, enclosing a copy of the following resolution passed at a meeting held on October 20. Resolved—

"That the Laboratory for Pharmaceutical Research about to be established by the Council of the Pharmaceutical Society is deserving of the most cordial support of this Association; and that this meeting trusts that the action of the Council of that Society will receive the unanimous approval and support of its members."

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The opening meeting of the tenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, 26th inst., at 9.15. Mr. George Lunan, President, in the chair. There was a large attendance of members.

Letters of apology for unavoidable absence were read from Messrs. H. Bellyse Baildon, chairman of the Executive of the North British Branch, J. B. Stephenson, chairman of the Scotch Board of Examiners, William Ainslie, Edinburgh, and John Nesbit, Portobello.

The minutes of the last meeting having been read and adopted, Mr. Lunan delivered the—

INAUGURAL ADDRESS.

Mr. Lunan commenced his address by referring to the fact that the meeting was held to inaugurate the tenth session of the Association, which he said had survived the trying time of childhood, and could now fairly claim to have established reasons and proofs of its necessity to the young pharmaceutical community. In comparing the position of a member of the Association with that of a young pharmacist in a town where there was no similar provision for the juniors, he had found abundant evidence of benefits resulting from such an association in the spirited enthusiasm manifested for more of that knowledge of the sciences surrounding the pharmacy of to-day, which must be the criterion of the fitness of the pharmacist for his duties. Generation of enthusiasm for a good purpose was an aim worthy an existence. Although there would always be men who, without anything in the way of nurturing, would by natural ability and love for work take a front rank, yet in many cases the want of a little encouragement to the dormant glow might prevent its development into a blaze. It was not necessary to enlarge on the question of the necessity for such associa-

tions of pharmaceutical assistants and apprentices in every large centre in the country; testimony to their value was given by some leading pharmacists of the day, who did not grudge to give some of the credit of their position to the training they received in meetings of juniors. There was much in the business that could not be learned in the shops; much also that could not be grasped in the schools (which hitherto had aimed too often chiefly at increasing their pass lists, to the detriment of the student's general knowledge and real fitness for his position as a useful pharmacist), but which was expounded, discussed and thoroughly sifted in their meetings. It was a fact also borne out by experience, that the want of a junior association told heavily on the interest taken in the meetings of seniors of the same town, for the one was an admirable training ground for the other. He had therefore always maintained that more general encouragement and support should come from the seniors to the juniors, and that wherever seniors found a difficulty in getting a sustained interest in their own proceedings, they should lend their names and patronage to the formation of something likely to set their apprentices and assistants thinking that their calling was at least as much a profession as a trade. He might go further, and claim from the Council of the Pharmaceutical Society more practical proof of its interest and belief in the educational facilities provided by such meetings. The assistants and apprentices of Aberdeen, aided and abetted by their masters, had succeeded in drawing from the Pharmaceutical Society a sum of money sufficient, with the aid of local subscriptions, to equip and carry on a useful laboratory. The assistants and apprentices not only had access to this, but had also the use of the reagents and apparatus, and, under certain conditions, of a microscope. He had had the pleasure of looking over this laboratory when in Aberdeen recently, and had thought that the usefulness of the Edinburgh Association might be increased by pursuing similar tactics. Although the Council of the Pharmaceutical Society had in its Pharmacy Acts Amendment Bill, commonly known as the Curriculum Bill, a panacea for all the ills through which pharmacy was at present struggling, some of the rank and file might be excused for indulging in doubt as to the efficacy of this much-vaunted nostrum. He believed that the rank and file were intensely apathetic as to the future of the Bill. Most of those who had forded the river thought that in view of it the journey was well over; and a majority of those who were preparing for examination thought that with pharmacy at its present low ebb there was no need for a curriculum. The great majority of pharmacists had not reached a stage where they were able to appreciate the good which the Council would feign do them. He said "the Council" without fear, because it was admitted that the Council, and it only, had been nurturing this piece of legislation. The Council had begun at the top of the abuse, not at the root of the evil. Had it commenced by endeavouring to gain the sympathy of its constituency it might have hoped to consolidate the whole mass into unity of purpose. In giving his own opinion regarding the Bill, Mr. Lunan said that those who most bitterly opposed it had furnished from their principal argument—that the public did not want it, and that there was no reason why pharmacists should burden themselves with it—the very ground for which pharmacists should more urgently demand it. It was not because pharmacists thought the public had not a sufficiently educated class of persons to distribute and compound medicines that they wanted a curriculum, but because they wished the public fully to comprehend that they were not mere drugs clerks, but trained and educated pharmacists. So long, however, as they continued to get trained without recognized colleges the public would believe that a fortnight's attendance behind a druggist's counter would fit any person to fulfil their tasks. Still, as a matter of expediency he felt that until the apathy of the mass of pharmacists could be removed the Council would fail to interest Parliament in curriculum bills. An important use of such meetings as those of the Association was the stimulus they gave to apprentices and assistants to read up useful information. Many procrastinated until they were ashamed to commence with younger men studies they had neglected at their proper season. Many of this class were now the dependants which the want of a qualification made them, because they had never come under the spirit and influence of such meetings. Nevertheless, it was a fact beyond doubt that many branch shops were under the management of assistants of this class. This he considered was not to the credit of the employing firms, though he could easily understand their reasons for the arrangement Unqualified assistants had less independence than qualified managers, and there was more likelihood of their remaining longer in the service, as they had no inducement to start for themselves. He did not say this from any animosity to the class, who were themselves the greatest losers, as he had met many of them who were just as good assistants as qualified men. Still, the underlying principle remained the same, and it did not become any such employing firms to growl against the Pharmaceutical Council for not energetically prosecuting cutting firms whose capital was found by speculative persons, but who employed a phalanx of qualified assistants. He thought it would be for the benefit of the individual members of the Association that such questions should be freely discussed. Nothing would be gained to legitimate pharmacy by a continuation of the *infra dignitatem* whinings that stocked the journals weekly so long as they had a beam requiring removal from their own eyes. They should show that they were not afraid of thorough free trade in pharmacy, with, of course, the fair protection their qualifications should bring with them, and that they felt sure that by acquiring a thorough knowledge of their profession and trade they might come to claim a protection from the public requiring no entry on the statute books of the country. Quoting next the passages in Sir Dyce Duckworth's address in which the position of chemistry and pharmacy on the continent was favourably contrasted with their position in this country, Mr. Lunan said there could be no doubt as to the exactness of this statement, and that unless his hearers were willing to become Americanized drug clerks, it behoved them to be up and doing. The Council of the Pharmaceutical Society had adopted resolutions as to a research laboratory and the teaching of practical pharmacy, and this might prove to be the beginning of a more extended endeavour to stir pharmacists up to a proper appreciation of the duties of their calling.

On the motion of Mr. George Coull, Vice-President, a cordial vote of thanks was awarded to Mr. Lunan with acclamation.

Mr. Gilmour, in seconding the vote of thanks, said that he had frequently had the pleasure of trying to encourage the Association to go on with the good work he felt assured they were doing. He had listened with much gratification to the very thoughtful address of the President. He would not attempt to criticize it or to follow Mr. Lunan in his references to pharmaceutical politics. There were two points which he would like to emphasize. One was the importance of individuality in their work. His experience convinced him that to command success in their calling, they must throw their whole energies into it and give it the impress of a strong personality which would defy competition. He had a difficulty in finding a term to exactly define his second point, which he would call capability. They should earnestly seek to be qualified for their duties in the fullest and highest sense of the word. The other day he was looking over the list of those whom he had examined and who had become pharmaceutical chemists, and he found that every one of them had succeeded, and he felt certain that the man who cultivated individuality and sought thorough

capability would inevitably succeed. He heartily seconded the vote of thanks which had been proposed by Mr. Coull.

The discussion was continued by Messrs. Baker, Boa, Duncan, Henry, Hill, Mackenzie, Melvin, Taylor and Wilson.

The Chairman having intimated that the next meeting, on November 9, would be an open one, under the charge of Mr. William Duncan, Ex-President, the meeting was closed.

The Annual Conversazione has been fixed for Friday, December 23, in the Literary Institute, South Clerk Street.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The nineteenth annual meeting of this Association took place in the Memorial Hall, Albert Square, Manchester, on October 26, Mr. W. Wilkinson, Vice-President, in the chair.

Mr. Benger, one of the Hon. Secretaries, read the annual report of the Committee. With the object of increasing the membership of the Association, the annual subscription had been reduced to 5*s*., and the monthly meetings had been devoted to the discussion of matters of scientific or trade interest introduced by members in an informal manner.

The result had been fairly satisfactory, sixty-two members had subscribed, and many had joined in the discussions. It was proposed to continue this arrangement during the present session.

Mr. G. S. Woolley, Treasurer, read the statement of accounts, which showed a balance in hand of about £11 on the general account, and £11 to the credit of the Library Fund.

The reports having been adopted, Mr. Benger expressed his wish to be relieved from the duties of Secretary, a post which he had held for nineteen years, from the formation of the Society. A cordial vote of thanks was awarded to him for his services, and the appointment of a joint Secretary with Mr. W. Elborne was left to the incoming Council. The officers and committee were then re-appointed, Mr. Benger being elected a Vice-President.

A discussion took place as to the advisability of forming a Trade Defence Association in connection with this Association, and the matter was referred to the Council for consideration.

The British Association for the Advancement of Science.

ADDRESS TO THE CHEMICAL SECTION.

BY EDWARD SCHUNCK, PH.D., F.R.S., F.C.S.

(*Concluded from page* 355.)

Intimately connected with this subject is that of chlorophyll, the green-colouring matter of leaves, which is always found wherever the process of assimilation in plants is going on, and nowhere else, and is therefore doubtless an essential factor in the process. What part it plays in this process is, in my opinion, still unknown. Its action is probably in part chemical, in part physical, and this adds, it may be, to the difficulty of understanding it. It is generally supposed that it is chlorophyll which by its direct action on the carbonic acid and water with which it comes into contact leads to the formation of organic matter with elimination of oxygen. But this is, I think, a mere assumption—an error due, like many others, to a mistaken use of terms. The chlorophyll of chemists is simply an organic colouring matter, like alizarin or indigo, but being in the vegetable cell intimately associated with other matters, vegetable physiologists have attributed to the action of one, and that the most obvious, constituent what is really due to the complex, perhaps even to some quite other constituent of the complex. It is impossible to conceive that the chlorophyll of chemists can be endowed with the remarkable and exceptionable properties attributed to it by physiologists ; it is a chemical entity, nothing more. It may indeed be said that chlorophyll only acts as it is stated to do when enclosed within the vegetable cell, but this merely amounts to saying that its action is not purely chemical, but is controlled by the vitality of the cell, which, I suppose, means the action of the protoplasm. If chlorophyll is the agent whereby the decomposition of carbonic acid and water is effected ; how, it may be asked, is the agent itself produced ? It does not come from without ; the plant must be able to form it in the first instance. We are told by vegetable physiologists that the coniferæ when raised in total darkness from seeds produce chlorophyll. In light or in darkness I am convinced it is the same ; the plant forms chlorophyll as a means to an end. What the end is we know ; it is the assimilation of carbon and hydrogen to form organic matter. How does the chlorophyll assist in attaining this end ?

In propounding a new theory in reply to this question I venture to claim your indulgence, such as has been accorded to some of my predecessors and others who at these meetings of the British Association have been permitted to make statements and use arguments of a novel or paradoxical character, which, if they effect nothing else, at least afford a relief to the usual routine of scientific reasoning. My experiments on chlorophyll have led me to infer that the constitution of that body is much less simple than it is generally supposed to be. I do not mean by this that chlorophyll is a mixture in the usual sense ; everyone who has paid any attention to the subject knows that ordinary chlorophyll consists of several colouring matters, some of which are yellow, not to mention fatty matters which are unessential. What I mean to say is this, that the pure green substance, the chlorophyll *par excellence*, does not belong to the same class of bodies as alizarin or indigo, but contains three elements, each of which is essential to its constitution, one being a basic nitrogenous colouring matter, the second a metal or a metallic oxide, the third an acid, the three together constituting green chlorophyll. The basic colouring matter is a body of very peculiar properties ; it is the phyllocyanin of Fremy : the metal may be iron or zinc, the acid I will suppose to be carbonic acid. Now the plant having formed its colouring matter, the metallic oxide being present in some form or other, and the carbonic acid being supplied by the atmosphere, all the necessary conditions co-exist for the formation of chlorophyll. The compound is an unstable one ; it easily parts with its carbonic acid, giving it up to the protoplasm or whatever the agent may be that effects its actual decomposition under the influence of light. The advantage of this arrangement would consist in this, that the carbonic acid would be presented in a more condensed state to the agent which effects its decomposition than if it were merely contained in a watery solution, but more loosely combined, and therefore more easily accessible than if it were united to a strong base, such as potash or lime. The carbonic acid having been disposed of, the other two constituents would be in a state to take up fresh quantities of carbonic acid and so on. Chlorophyll would therefore act as a carrier of carbonic acid in the plant, just as hæmoglobin serves to convey oxygen in the animal economy. Numerous objections may of course be raised to the theory of which I give an outline ; I only throw it out as a tentative explanation, showing that the function of chlorophyll may be, in part at least, chemical, and that we need not suppose it to be endowed with the marvellous and exceptional powers usually ascribed to it. Other and more probable explanations will doubtless

suggest themselves when this difficult subject has been more thoroughly worked out. Eventually too, it will be found, I imagine, that physical forces as well as chemical affinities play a part in this as in every other process of the vegetable economy. In the case of chlorophyll there can be no doubt that the green colour and the peculiar behaviour towards light have something to do with its action, but on this point it is not necessary for the chemist to pronounce any opinion. I may take this opportunity of mentioning the important experiments of Sachs and Pringsheim on the optical properties of chlorophyll in their relation to assimilation in plants, as they are probably not so well known to chemists as to botanists.

What I have said may serve to show that the very first steps of the process whereby organic or organized matter is formed in plants are hardly understood. We understand still less the further steps leading to the production of the more complex vegetable bodies—acids, alkaloids, fatty matters. Granted that we were able to trace the formation in the plant of a compound of simple constitution, such as oxalic or formic acid, how far should we still be from understanding the building up of such compounds as starch, albumen or morphia? The syntheses so successfully and ingeniously carried out in our laboratories do not here assist us in the least. We know the steps by which alizarin is artificially produced from anthracene; but can anyone for an instant suppose that the plant commences in the same way with anthracene, converting this into anthraquinone, and having acted on the latter first with acid, then with alkali, arrives at last at alizarin? Indeed the plant never contains ready-formed alizarin at all. What we observe from the commencement is a glucoside, a compound of alizarin and glucose, which, so far as we see, is not gradually built up, but springs into existence at once. When we think of the complicated process by which indigo is produced in the laboratory with the various substances and appliances required, and then see how in the minutest seed-leaves of a plant like woad a still more complex substance, indican, is found ready formed, we stand confounded at the simplicity of the apparatus employed by the plant, and are obliged to confess that we have no conception of the means whereby the end is attained. The same difficulties occur in other cases, and it will therefore probably be conceded that the synthetic processes carried on in plants, from the first step to the last, are not in the least understood.

It might be supposed that after all the labour and attention bestowed on the inorganic constituents of plants we should know something of the part played by these constituents in the processes of assimilation and nutrition, but here the obscurity is as great as elsewhere. We know by experiment that certain inorganic matters —potash, lime, magnesia, iron oxide, phosphoric acid— are essential to the growth of plants; but of their mode of action, or of the reason why certain plants require potash salts, others lime, and so on, we know nothing. Phosphoric acid is no doubt an essential constituent of the protoplasm of the plant; but why cellulose, of which the various organs chiefly consist, should require mineral matters, which do not enter into its composition, for its formation and building up is still a mystery.

The department of chemistry which relates to the decomposition of organic and organized matters presents problems almost as difficult of solution as those relating to their formation and building up; that is to say, the phenomena observed do not apparently obey the same laws as those prevailing in the inorganic world. When I began my chemical studies the difference in this respect between mineral and organic compounds was less clearly seen than at present. The conversion of alcohol into acetic acid, the putrefaction of animal and vegetable matter were thought to be simply due to oxidation; they were phenomena, it was supposed, exactly similar to the rusting of iron, the tarnishing of metals, the fading of colours. That a third body was required to initiate and continue the process of decomposition, that organic matter in contact with purified air would remain unchanged for any length of time—was not known nor suspected. I am not quite sure whether spontaneous decomposition—*i.e.*, the splitting up of a complex body without the intervention of an external agent—might not at that time have been considered possible. In order to explain the phenomena of fermentation, the decomposition of sugar into alcohol and carbonic acid, for instance, we had only the theory of contact, devised by Berzelius and Mitscherlich, the latter of whom used to expatiate on the subject at great length in his lectures. When this ghost of a theory was laid by Liebig, who suggested an intelligible explanation of the phenomena in accordance with the facts then known, it was felt to be quite a relief, as affording a resting-place—if only a temporary one—for the mind. The brilliant researches of Pasteur, which have thrown so much light on the action of the insoluble organized ferments, I need only refer to, as they are so widely known, even outside scientific circles; and since also investigations such as his cannot be discussed without some reference to biological questions, which cannot be entered on now. I will confine myself therefore to a few remarks on the unorganized or soluble ferments, one of which I had occasion to examine when engaged in investigating madder and its colouring matters. These ferments, the type of which is diastase—a substance found accompanying starch in the seeds of plants—are soluble in water, perfectly neutral, devoid of all definite form, and though apparently inert able when acting within the sphere in which nature has placed them to cause changes and decomposition of the most profound character. Their action excludes everything in the shape of vitality, and yet it is as mysterious and unaccountable as anything that the vitality of the organized ferments is capable of effecting. Indeed, in vegetable, and especially animal, organisms they seem expressly intended for the attainment of certain ends necessary for the well-being, or even the existence, of the organism, insomuch that it has been supposed, with some show of reason, that it is to bodies of this class existing within the cells of organized ferments, but not separable by any means at our disposal, that the changes produced by the latter are really due.

A great deal of attention has been paid to the products and results of fermentation, but very little hitherto to the *modus operandi* of the ferments themselves, and yet this seems to me to offer a wide field for interesting research, especially in the case of those of the soluble class, which are easily prepared, and can be manipulated in the laboratory like any chemical substance without the tedious precautions and preliminary operations necessary in the case of the organized ferments. In what way, it may be asked, do these soluble ferments produce the effects peculiar to them? Is the action essentially chemical, or is it due to physical causes as well? Is the quantity of fermentable matter acted on by a certain quantity of ferment unlimited in amount, or are there limits to that amount somewhere? Does the ferment itself undergo any change during the process of fermentation, or is it the same afterwards as before and capable of acting on fresh quantities of fermentable matter? When a ferment is replaced by a strong mineral acid, the products of decomposition being the same, is the *modus operandi* in both cases alike, or must a different explanation be in each case sought? These questions have never been satisfactorily answered, and await solution. I know of only one attempt to show what actually takes place during a process of fermentation set up by a soluble ferment.

The experiments of Wurtz* on papain, the soluble ferment of *Carica papaya*, led to the conclusion that the fibrin on which it is made to act combines in the first instance with the ferment itself, the latter after the hy-

* *Comptes Rendus*, xci., 787.

dration of the fibrin is completed being again set at liberty, and then able to act on fresh quantities of fibrin. Thus, according to Wurtz, the action is found to be the same as that of chemical agents, properly so called, such as sulphuric acid, of which minute quantities may exert a hydrating action in consequence of the transitory formation of compounds which are constantly being produced and again decomposed.

There is another question referring to these soluble ferments to which in the present state of our knowledge it is impossible to frame a probable answer, viz., why does it so frequently happen that each ferment exerts a specific action, an action peculiar in itself, this being in fact, in the absence of any marked chemical characters, the only means by which they can be distinguished one from the other? Why does one ferment act on starch only, while the function of another consists in the hydration of fibrin, that of another in the decomposition of a glucoside, and so on? In accordance with the explanation of Wurtz, we should say that a specific ferment is one capable of combining only with the body on which it is to act, and with no other. I was led to ask this question when engaged in the examination of the colouring matters of *Rubia tinctorum*. The root of this plant, the madder of commerce, contains glucosides, which, though coloured, are quite devoid of tinctorial power. Nature has at the same time placed in the root a peculiar ferment, which, coming into contact with these glucosides at a certain temperature, effects their decomposition, splitting them up into glucose and true colouring matters. Now this ferment is a body *sui generis* and cannot be replaced by any other ferment that I have tried; its action is specific. Why nature should have deposited this body in the recesses of the plant for the express purpose of acting on certain glucosides and forming colouring matters, the object of which, so far as the economy of the plant is concerned, can only be guessed at, is difficult to understand. One is inclined in such a case to revert to the old-fashioned doctrine that some natural processes were devised for the use and delectation of man. It is quite certain in the case of madder that had it not been for its peculiar ferment erythrozym, the valuable tinctorial properties of the root, which have for centuries been applied in the production of that splendid dye Turkey red, would have remained unknown perhaps to the present day, since the only efficient substitute for the natural ferment is a strong mineral acid, and such acids and their uses were unknown in former days.

I am inclined to think that some of the younger chemists and physiologists of to-day may live to see the time when all the at present mysterious and unaccountable processes going on in the organisms of plants and animals, including those of fermentation, will be found to obey purely physical and chemical laws. To the biologist it may seem derogatory to the dignity of his science to have the principle of vitality, which has so long reigned supreme, dethroned and replaced by hard, unbending law. Such, however, is not the opinion of that distinguished botanist Sachs, who says, referring to this very point:—"Der Organismus selbst ist nur die aus verschiedenen Theilen bestehende Maschine, die durch weitere Eingriffe äusserer Kräfte in Bewegung gesetzt werden muss: von ihrer Struktur hängt es ab, welchen Effekt diese äusseren Kräfte an ihr bewirken. Es würde einen sehr niedrigen Horizont wissenschaftlicher Bildung verrathen, in diesem Vergleich eine Herabsetzung des Organismus sehen zu wollen, denn in einer Maschine, wenn auch nur von Menschenhänden gemacht, liegt das Resultat tiefsten und sorgfältigsten Nachdenkens und hoher Intelligenz, soweit es ihre Struktur betrifft, und wirksam sind in ihr schliesslich dieselben Naturkräfte, welche in anderer Combination die Lebenskräfte eines Organs darstellen. Die Vergleichung des organischen Lebens mit unorganischen Processen kann nur dann als eine Erniedrigung des ersteren gelten, wenn mann so thöricht gewesen ist, die letzteren als etwas Niedriges und Gemeines aufzufassen, während die unbegreifliche Grösse und Durchgeistigung der Natur in beiden Fällen sich gleichartig offenbart."* The time may be far distant when these views of the great botanist shall be universally accepted; but they will, I think, sooner or later prevail.

The little known territory which separates the domains of chemistry and physiology will, in my opinion, offer a wide and interesting field for research, after that of pure chemistry shall have been exhausted or lost its interest. Most important problems connected with life and its relation to the inorganic world there await solution, and I confess that I am inclined to envy the young investigator who, coming provided with an ample store of chemical and physical knowledge, shall apply himself to the solution of these problems. The pleasures derived from the successful pursuit of such studies belong to the highest and purest that we are able to conceive. I can, however, only repeat what has so often been said before, and what the young man of science should not forget, that a life devoted to research only involves no material rewards; it certainly never secures wealth, sometimes not even honour nor fame. Looked on with indifference or even dislike by the State, the Church, and the public at large, all that the man of science can certainly look forward to at the close of his career is the addition at his hands of a few stones to the vast edifice of truth, and the consciousness of having attained a higher stage of intellectual insight.

You may probably expect me, before I conclude, to make some reference to technological matters, to the various chemical arts and manufactures for which the Manchester district is noted. At the last meeting of the British Association in Manchester a report on the condition at that time of manufacturing chemistry in the South Lancashire district, by Sir Henry Roscoe, the late Dr. Angus Smith, and myself, was laid before the Chemical Section. A similar report showing the progress made in chemical technology since that time would have been interesting. Great changes have taken place during the period that has elapsed, especially as regards the alkali trade, and quite a new branch of industry has been developed, that of the coal-tar colours. A description of these new features of our chemical industry with statistics of production would therefore have been acceptable. The idea of a report had, however, to be given up on account of the difficulty of obtaining reliable information as to details, and in these matters it is the details only which are interesting, the general features of the subject being well known. It can hardly be a matter for surprise, I think, that our manufacturers, considering the active competition to which they are exposed, and the disadvantages under which they labour in consequence of the exclusiveness of foreign nations, should be loth to furnish information which would benefit their rivals in trade. Several interesting papers on branches of chemical industry by gentlemen well versed in them will, however, be read before the Section, and these will, to a great extent, make up for the want of a general report. In the Chemical Section of our Jubilee Exhibition, too, you will see a very fine collection of chemical products, more extensive and beautiful, perhaps, than any previously brought together, and these will give you a good idea of our industrial activity. It would have been interesting to witness step by step some of the processes employed in the manufacture of these various products, but this, I am sorry to say, must not be expected generally.

To some it may seem that this Jubilee Exhibition shows the manufacturing industry and prosperity of this district at least at their highest state of development; that they are now at their meridian, and in the future are doomed to decline. If this be so—and there are certainly indications which seem to favour this view—it would be well for those whose visits here are only occasional to take especial note of the present state of things so as to be able to compare their impressions when

* *Vorlesungen über Pflanzenphysiologie.*

they next visit us with those now received, since gradual changes in communities, as in individuals, are more patent to casual observers than to those who are always on the watch.

From some points of view the signs of the times are certainly not encouraging. It should not be forgotten that the manufacturing prosperity of this district depends to a great extent on the ample supply of a product which is brought to us at some cost from tropical and semi-tropical countries to be re-exported in the shape of manufactured goods. A political convulsion abroad, and this, unfortunately, is a casualty that may at any time be expected, or even the determination on the part of other nations to starve us out, however short-sighted such a determination might be, might cut off our supplies and disable us permanently, as we were partially disabled twenty-five years ago. If to this be added the fact that foreign nations are becoming increasingly hostile and exclusive commercially, we cannot feel surprise at the dismal forebodings entertained and the confident predictions of decline uttered by some who claim to know all the facts. I ought to apologise for alluding to so gloomy a subject on the occasion of this to a great extent festive gathering, but then men of science like to look at a question not only from a hopeful but from every point of view. Fortunately on this question they are not called upon to pronounce any opinion one way or the other.

Should this be the last time that Manchester shall entertain the British Association in the day of its prosperity, I can only say with the German poet—

Schliesst den Kreis und leert die Flaschen
Die Sommernächte feiernd,
Schlimme Zeiten werden kommen,
Die wir Auch sodann ertragen.

Whether in prosperity or adversity I feel sure that this city will always endeavour to entertain its visitors to the best of its ability. On the present occasion I may with confidence on the part of the chemical world of Manchester offer to the many friends from near and far who honour us with their presence at this meeting a most hearty welcome.

Obituary.

Notice has been received of the death of the following :—

On the 25th of October, Mr. John Addinell, Chemist and Druggist, North Fort Street, Leith. Aged 49 years.

On the 26th of October, Mr. John Henry Blunt, Chemist and Druggist, Northampton. Aged 68 years.

On the 28th of October, Mr. John Moore Holliday, Chemist and Druggist, Week Street, Maidstone. Aged 78 years.

On the 1st of November, Mr. James Edwards, Chemist and Druggist, High Street, Leicester. Aged 63 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Irish Pharmacy Act.

Sir,—Permit me the liberty, through the medium of your columns, of addressing Irish pharmacists, and to arouse them to a danger from a quarter least expected. It is an open secret that the promised deputation of chemists and druggists from Belfast will gain many a friendly ear in the Council. It is time licentiates should speak out on this subject of perpetuating chemists and druggists, lest those members of Council should snatch a vote on a division for such an object. I hold the Council can only support one grade (*i.e.*, pharmaceutical chemists), which was the reading of the Act by the original Council, section 31 securing the status and privileges to those chemists and druggists who were practising as such at the time of the passing of the Act, and if I add apothecaries, I hold the "Pharmacy Act" entitles these only to sell poisons, and to these only poisons are to be entrusted.

I also hold there is not room in Ireland for two grades. By the advocates of the second grade system a comparison has been drawn between the number of post towns, and the number of licentiates, for two reasons. First, to show Ireland can support a second grade. Secondly, to show the disadvantages which the public labour under in obtaining poisons. I may well ask them, are they serious in these contentions, or do they speak with any knowledge of country towns (which are getting beautifully less), or do they know the extent of the majority of these post towns, most of which consist of a court-house, police barrack, places of worship and post office, the greater portion of the population being comprised of the labouring classes and small farmers, who come under the poor law system, and receive their medicines from the dispensary doctor? Do they expect chemists to repair to such places? No, not even if there were ten times as many qualified. And then as to increasing the facility of the public getting poisons, I speak from experience of country business. What will be the result of such a grade? It will be this: every intelligent grocer in moderate-sized country towns will come up and get registered, and I ask anyone, even with a slight knowledge of country towns, how much time will he devote to this branch of his business, he having his drapery counter, his grocery and spirit counter, his provision counter, and his farm (for such is the general combination in the country)? The answer is simple. None! His apprentices will be entrusted with the sale of poisons, and it will be retailed out at the same rate and profit as tobacco and sugar. May I ask, is this the grade the Council are going to establish and perpetuate, the direct opposite to what the promoters of the "Pharmacy Act" sought and obtained to have abolished, and have replaced in their stead men whose competence is established, and in whom the public have confidence? I challenge the Council to take a vote of its licentiates; and I should warn members, in whose hands election of Council is placed, to note the men who support this grade. Is it necessary to remind the Council that the majority of their Licentiates are in business for themselves, and the remainder are languishing (more or less) to take on?—and I notice men are coming up in greater numbers for examination now than any other time of the Society's history. I await the result of the deputation with much interest.

A Dublin Pharmaceutical Chemist.

Tincture of Red Gum and Glycerine of Borax.

Sir,—In reply to 'A Dispensing Query,' by J. H. P., in *Pharmaceutical Journal* for October 22, p. 356, the eau de cologne, tr. myrrh and glycerine of borax should be first mixed together, then the tr. red gum added gradually. A good eau de cologne (all spirit) should be used, and the glycerine of borax should be made according to the British Pharmacopœia of 1867. I believe the prescription was originally written before the publication of the British Pharmacopœia of 1885.

Mixed as above a bright clear preparation of the colour of tr. cardamomi co. results, which does not separate or gelatinize on keeping. Ernest H. Barritt.

Syrupus Ferri Phosphatis Compositus.

Sir,—In reference to your footnote appended to the formula of above in your last issue, I may state that the quantity (4 pints) which I prepared six weeks ago is still perfectly bright. During that period it has been supplied whenever "Parrish's syrup" has been required, and I have heard no complaints of its being unpalatable.

Phosphas.

We are obliged to a correspondent for forwarding to us a copy of the *Leicester Daily Mercury*. If he will refer to the Journal for October 22, p. 346, he will find that the subject has been already dealt with.

Communications, Letters, etc., have been received from Messrs. Thresh, Gravill, Allen, Dott, Humphreys, Turnbull, Boyce, John.

FLETCHERS'
Concentrated Liquors

Recent Opinions of Pharmacists.

From MR. WILLIAM ALEXANDER, Banff, N.B.

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From MR. JOSEPH BARKER, Yarmouth.

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From MR. J. NEWSOME BAXTER, Wath-upon-Dearne.

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From MR. JOSEPH N. CUTTS, Morecambe.

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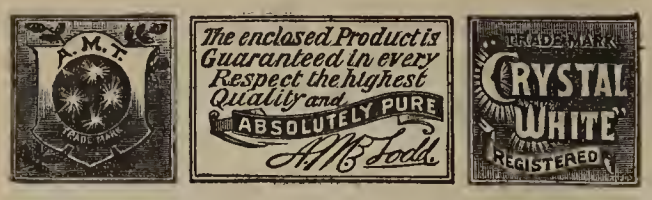

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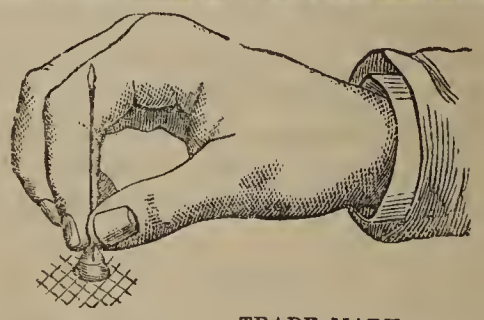

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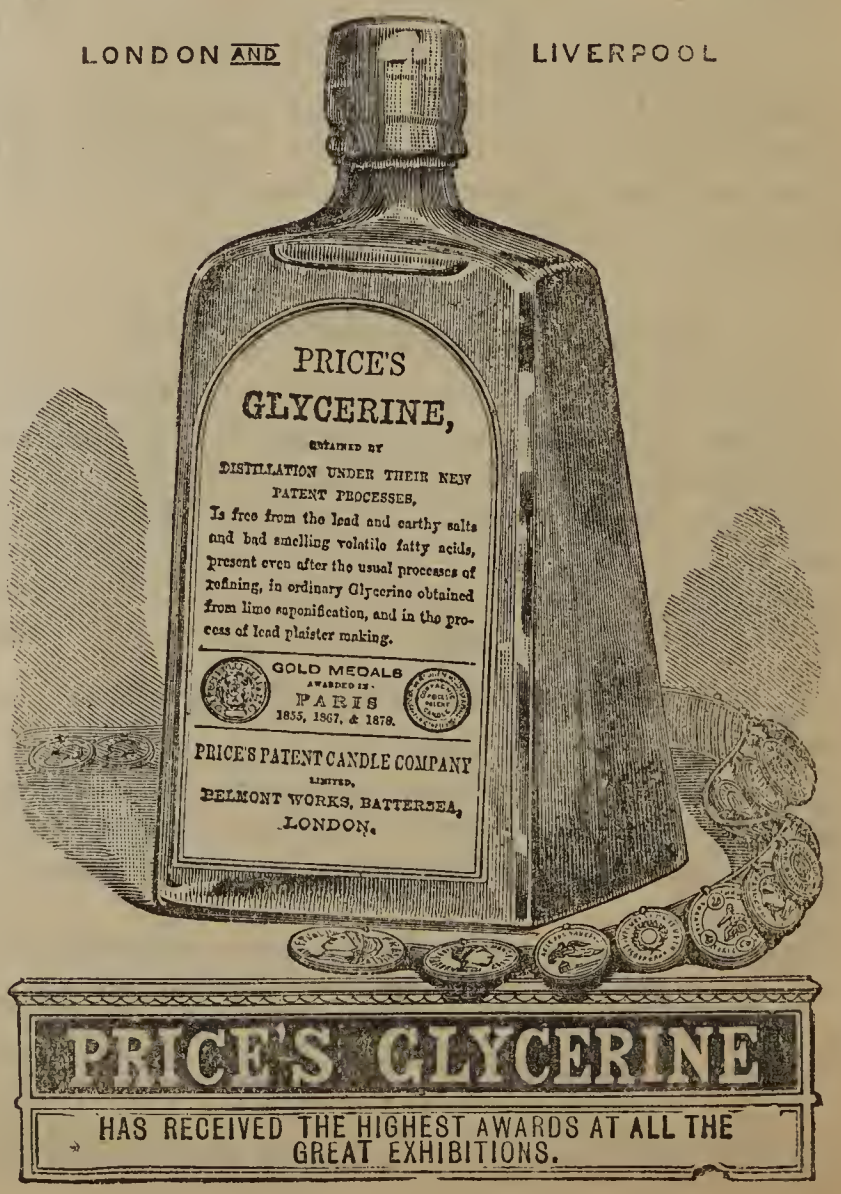

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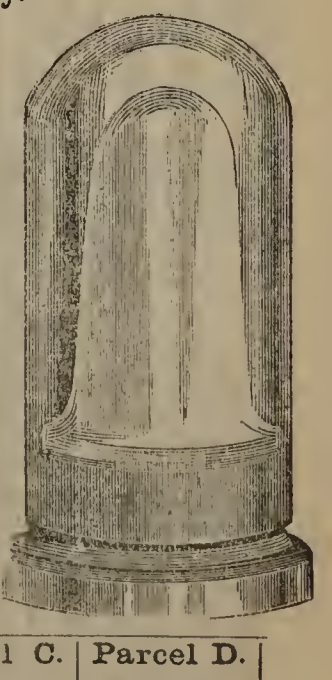

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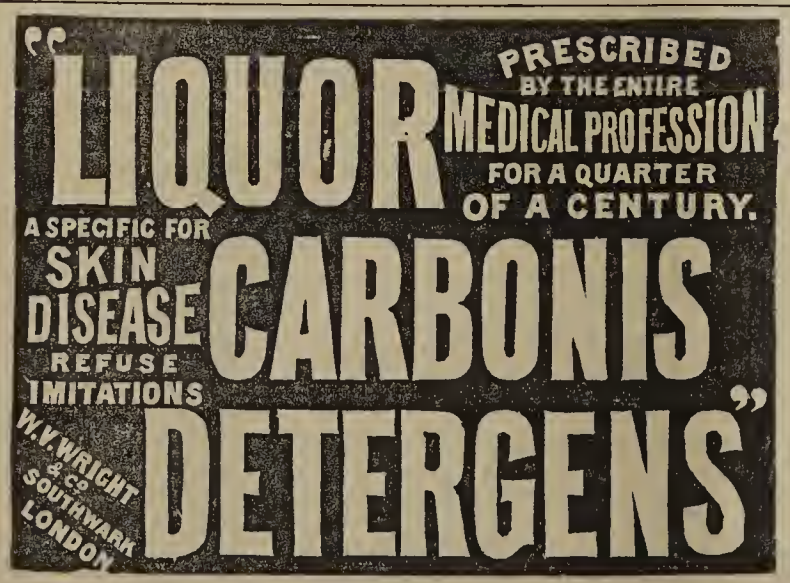

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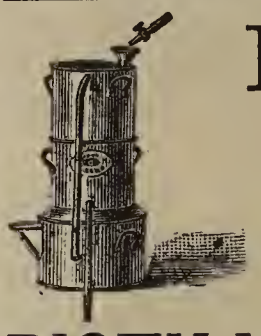

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Mr. J. ARDERN.
„ J. BIRD.
„ W. DOWNES.
„ F. HART.
„ B. HARWOOD.
„ J. C. CROMPTON.

Mr F. BAKES.
„ F. E. EVANS.
„ W. GADDES.
„ S. JESSOP.
„ R. WILSON.
„ T. ROBINSON.

At the July Examination EIGHT Students from M.C.P. passed the Minor.

THIS YEAR'S CLASSES ARE NOW FULL.

THE NEXT SESSION WILL BEGIN ON JANUARY 2ND, 1888.

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At the London Examinations held in October the following results from Students of this School were attained :—

2 Major Candidates presented themselves, **1** passed, viz., Mr. J. E. WILLIAMS.

22 Minor Candidates presented themselves, of whom the following **18** were successful :—

MR. R. H. BARKER.
„ R. COLEY.
„ E. B. DUNN.
„ A. E. FARDON.
„ W. G. GALE.
„ A. P. GOLDEN.
„ A. F. HEALD.
„ G. H. HORNE.
„ J. A. JENNINGS.

MR. S. H. HALL.
„ A. J. PARISH.
„ J. H. PARKER.
„ D. PHILLIPS.
„ A. E. HICKMOTT.
„ M. H. GIBSON.
„ F. TREE.
„ A. VAWSER.
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Demonstrator : **Mr. T. W. CARR.**

PASS LIST FOR OCTOBER.

MINOR.

5 sent in, **all passed**, viz.—

Mr. T. EDMONDSON..... .....Cockermouth.
„ G. J. KERR .....Liverpool.
„ H. MADDOCK .....Manchester.
„ J. W. WHITELY .....Gainsborough.
„ F. H. WILKINSON .....Tranmere.

PRELIMINARY.

2 sent in, **both passed**, viz.—

Mr. J. R. AMBLER .....Birkenhead.
„ H. SCHUHMACHER..... .....Liverpool.

JULY.

4 passed the Minor, **all at their first attempt**, viz.—

Mr. W. BENTLEY.....Egremont.
„ F. BIRKETT .....Workington.
„ T. W. CARR .....Knaresborough.
„ T. CLOUGH .....Liverpool.

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At the Examination held last month, the following Students of this College were successful :—

MAJORS.

Mr. H. L. CARTER .....London.
„ W. J. COLLETT .....Nantwich.

MINORS.

Mr. D. S. BARBER .....Dursley.
„ J. M. BEANLAND .....Keighley.
„ H. B. BILLINGTON.....Barnsley.
„ G. BIRKETT.....Morecambe.
W. T. BLEWETT.....Penzance.
„ C. COTTON.....St. Helens.
„ J. H. DUNN .....Hull.
„ J. G. EVERETT .....Ipswich.
„ J. B. FORSTER .....Carlisle.
„ A. R. FRESSON.....Stevenage.
„ L. A. HUTCHIN.....Saffron Walden.
„ W. H. P. KENT..... ...East Molesey.
„ G. INGLE.....Bradford.
„ F. C. LEAT.....Ringwood.
„ W. PLUMBLY.....Norwood.
„ E. POLACK.....Rochester.
„ E. WHITE .....Bristol.
„ T. A. WHITE.....Basingstoke.
„ C. E. WILKINSON .....Bridgnorth.
„ A. L. WYCHERLEY .....Whitchurch.

PRELIMINARY.

Mr. J. BAKER .....London.
„ T. S. CAMPKIN .....London.
„ W. F. ELLIS ....London.
„ S. M. GREEN .....London.

EVENING CLASSES

Are held on Tuesday, Wednesday, Thursday, and Friday Evenings, from 7 till 9. Tuesday and Thursday for Dec. Exam., Fee 10s. 6d. Wednesday for the Feb. or April Exam., Fee, 3 months £1 1s. Friday for Preliminary Students.

At the Pharmaceutical Examinations held last month 2 students only presented themselves from these classes, both passed—

Mr. H. B. BILLINGTON. | Mr. J. H. DUNN.

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At the October Examination, *five* gentlemen from the Day Class presented themselves, *four* passed.

Classes for December now in progress.

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ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 29 Pupils passed the last Examinations.

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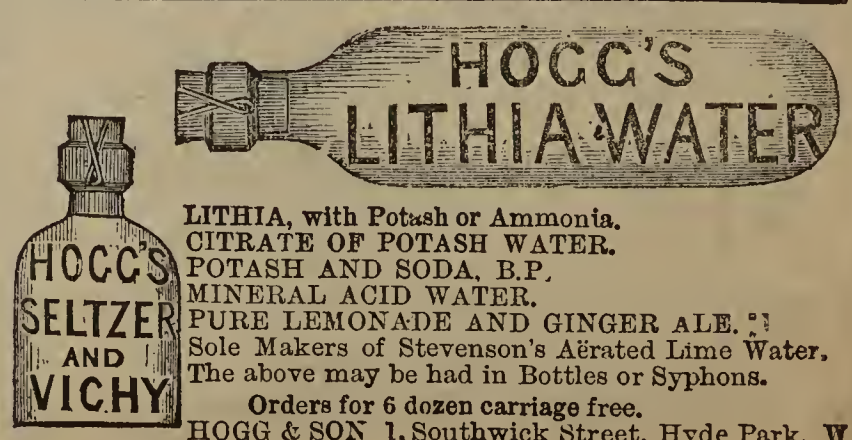

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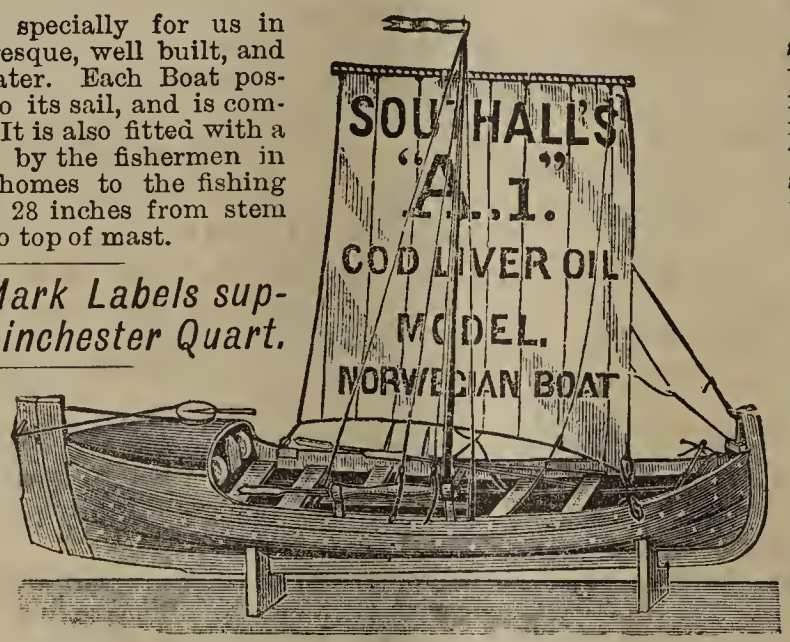

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 907.] SATURDAY, NOVEMBER 12, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

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EVENING MEETING.

36, YORK PLACE, EDINBURGH.

An EVENING MEETING of the Society will be held in the Society's House, 36, York Place, Edinburgh, on Wednesday next, November 16th.

The Inaugural Address will be delivered by ALEX. CRUM BROWN, M.D., F.R.C.P.E, D.Sc., F.R.S., Professor of Chemistry, University of Edinburgh.

The chair will be taken at half-past eight precisely by Mr. H. BELLYSE BAILDON, B.A. Cantab., F.R.S.E.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 2nd day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 5th, 1887.

For list of approved Candidates see Journal, October 22, page ii.

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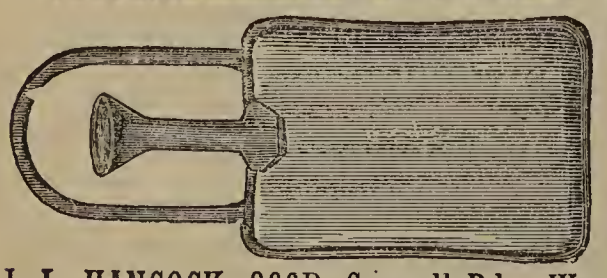

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Guaranteed to contain the proportion of Nitrous Ether directed by the British Pharmacopœia.

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FOR SHIELDING THE LUNGS.

Fig. 3.
Double, for the Chest and Back.

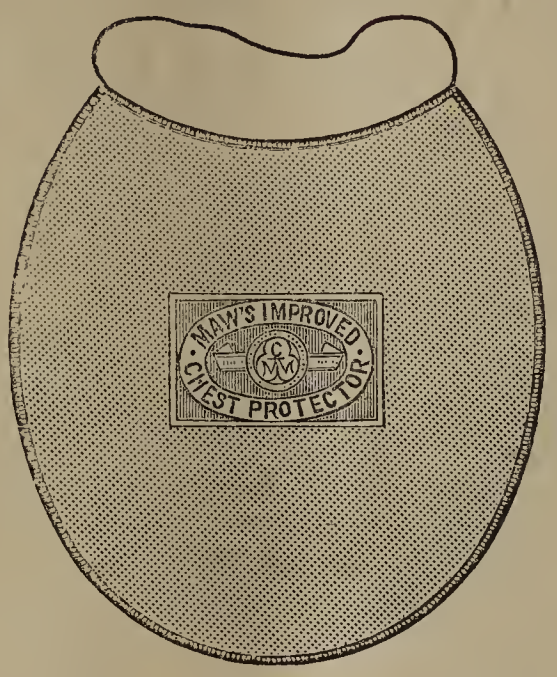

Fig. 4.
Single, Chest Protector.

Fig. 5.
Vest, a Shield for the Lungs.

CHAMOIS AND FLANNEL.

		No. 1.	No. 2.	No. 3.	No. 4.
Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	,,	24/	32/	38/	46/
Fig. 4. Single	,,	9/	11/6	13/6	16/
Ditto, perforated	,,	11/	14/	16/	19/
Fig. 5. Vests ,,	,,	27/	34/	42/	51/

FELT, ASSORTED SCARLET AND WHITE.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Fig. 3. Double, best, per doz.	17/	22/	27/	33/	44/
Ditto, second ,,	14/6	19/	23/	28/	37/
Fig. 4. Single, best ,,	7/6	9/6	11/	14/	20/
Ditto, second ,,	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet ,,	17/	22/	27/	33/	40/

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	White Fittings.			Black Fittings.		
Alexandra, China or Wood Top Corks, per doz.	3/8	—	—	4/3	—	—
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Export, China or Wood Top Corks ... ,,	3/6	—	—	4/-	—	—
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Export, Glass Screw Stoppers ... ... ,,	4/-	7/6	—	4/6	8/-	—

FOR FURTHER PARTICULARS SEE QUARTERLY PRICE CURRENT, PAGES 46 and 47.

SPECIAL QUOTATIONS TO WHOLESALE BUYERS.

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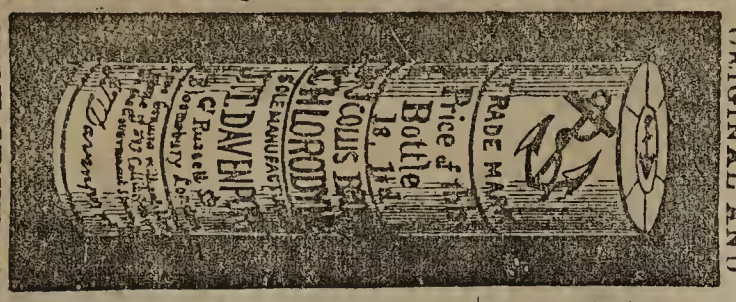
THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE.  ORIGINAL AND

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COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & CO., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

SOLE MANUFACTURER,
J. T. DAVENPORT, 33 Gt. Russell St., W.C.

THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John, & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
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Ferris & Co.	Bristol.	Maw & Son	,,	Yates & Co.	London.
Foulger, S., & Son	London.	Meggeson & Co.	,,		

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

Sold in Bottles—1s. 1½d., 2s. 9d., 4s. 6d., and 11s. Usual Discount to the Profession.

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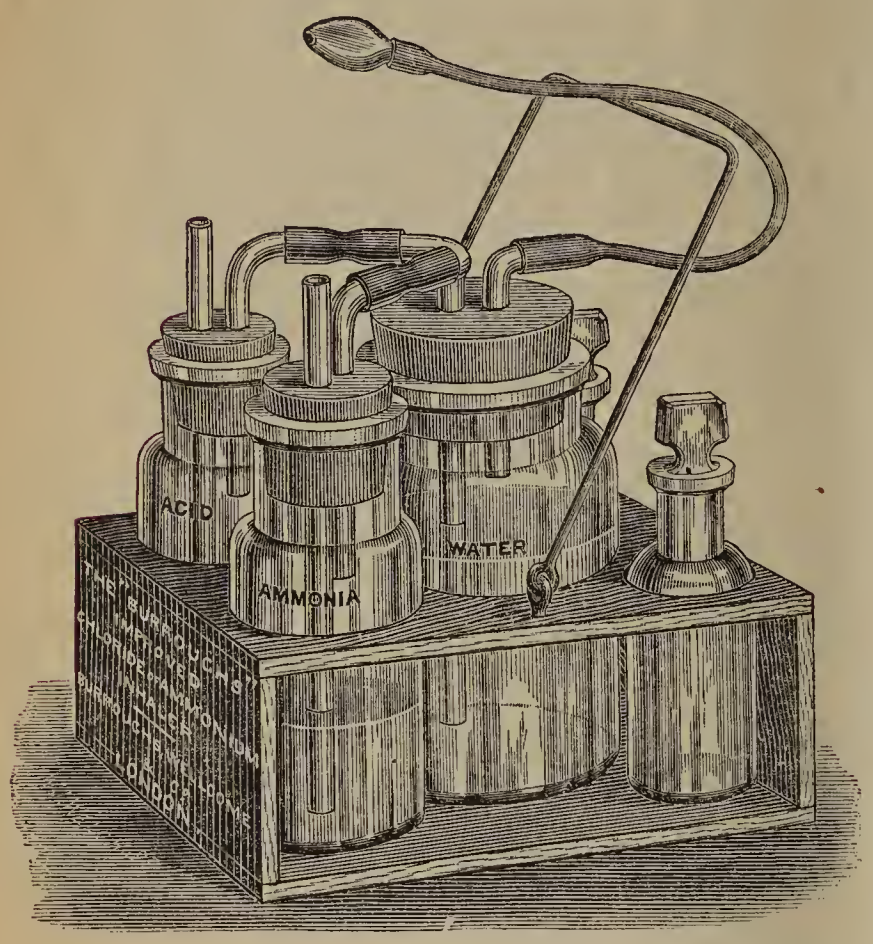
J. T. DAVENPORT, Pharmaceutist, 33, Gt. Russell St., Bloomsbury Sq., LONDON.

SEASONABLE AGENTS,

Prescribed for the Throat and Lungs.



The "Burroughs" Chloride of Ammonium Inhaler.

(VEREKER'S PATENT).

Probably no one agent is more used by throat specialists than Chloride of Ammonium vapour.

The specific effects of this vapour on the respiratory membrane have long been known, but the drawback has been that on account of an excess of acid or alkali the fumes were apt to prove irritating. By passing them through water, as in the Burroughs Improved Inhaler, and regulating the tubes, this fault may now be completely overcome and perfect purity made certain.

The chief advantages afforded by this inhaler are that it is easy to prepare, and for weeks and months is always ready for use; that the fumes are neutral, and that anyone can use it without trouble. The fumes it yields cause no irritation, and exert a truly wonderful action upon thickened mucous membrane, and thick tenacious secretion. They may reach the remotest parts of the respiratory mucous surfaces, and are absolutely harmless.

"In an able article in the *Lancet*, of February, 1887, Dr. Kendal Franks says :—"In chronic catarrh of the post nasal region, so frequently associated with deafness, due either to chronic otitis media, or to obstruction of the Eustachian tubes, I have found the regular use of the inhaler for weeks or even months give the most satisfactory results."

"The vapour of the Chloride of Ammonium removes unhealthy and offensive secretions, and restores the long diseased or weakened nasal and respiratory mucous membrane to a healthy state, so that in the case of catarrh, where thickening, induration and irritation exist, a most decided improvement is brought about in a short time." In "throat-cough," pharyngeal irritation, and relaxation and weakness of the throat, it acts as a most effective local alterative and tonic to the mucous membrane.

Dr. FRANKS, Dublin University, says :—"It is the best I have ever used, and I think I have tried all the different Chloride of Ammonium Inhalers hitherto devised."

Dr. SMYLY, Ex-Pres. Royal College of Surgeons, says :—"It is the best Inhaler for Chloride of Ammonium I have met with."

Pure Terebene (Burroughs).

The original experiments with Terebene were made with our preparation, and physicians well know how very satisfactory the results obtained with it were. Dr. Murrell gave the drug in considerably over 100 cases of Winter Cough, its systematic use being followed by marked improvement in every case. The doctor found it a powerful expectorant, which, "if inhaled the first thing in the morning, when the mucous membranes are covered with thick viscid secretion, will give very great relief." Pure Terebene (Burroughs) has a delicate fragrant odour like newly sawn pine, is bland and unirritating, feels smooth upon the tongue, and agrees well with the stomach. The results obtained with it in chronic bronchitis, flatulence, and some renal and bladder troubles, have been generally excellent, and often truly remarkable. We commend the following to those who have tried some of the terebenes of the market in vain :—

Report of R. M. Lacy, of South Devon and East Cornwall Hospital :—

"* * * The Terebene we have used for a bad case of bronchitic asthma with the best results. No irritation of the throat as one finds with crude preparations! In fact, the patient could not take the so-called 'Pure Terebene' other than Burroughs'."

The following report is from the distinguished laryngologist and medical author, Dr. J. Solis Cohen, Philadelphia, U.S.A :—

"The Burroughs Terebene I have been prescribing ever since I have known it, in preference to any other."

It is to the irritating and impure qualities of inferior and cheap imitations that much of the want of success in certain cases may be attributed.

Physicians' prices, 9d. and 1s. respectively. Special prices to Hospitals.

BURROUGHS, WELLCOME & CO., Snow Hill Buildings, LONDON, E.C.

NOTES ON TREBIZONDE HONEY.*

BY J. C. THRESH, D.SC., F.I.C.

Some time ago Mr. Holmes placed in my hands two samples of honey, which he had received from Mr. A. Biliotti, H. M. Consul at Trebizonde. This honey is reputed to be poisonous, and as the poisonous principle is by many writers ascribed to the ericaceous plants which abound around Trebizonde, Mr. Holmes desired me to ascertain, if possible, whether the honey contained "andromedotoxin," a poison isolated by Professor Plugge from the *Andromeda japonica*, and which he has since shown to be present in other poisonous Ericaceæ. The results of my labours have not been altogether satisfactory, but the subject is one of such interest that perhaps no other apology is necessary for presenting them, together with an account of Dr. Stockman's physiological experiments with the poisonous principle.

The first record of the poisonous property of the honey found near Trebizonde occurs in Xenophon's account of the 'Expedition of Cyrus,' better known perhaps as 'The Retreat of the Ten Thousand' (Xenophon, lib. iv., c. 8). Having ascended the mountains of the Colchians (two days' journey from Trebizonde) and put to route the inhabitants, the Greeks encamped in their villages.† "There being great quantities of beehives in those villages, all the soldiers who ate of the honeycombs lost their senses, and were seized with vomiting and purging, none of them being able to stand upon their legs. Those who ate very little were like men very drunk, and those who ate very much like madmen, and some like dying persons. In this condition great numbers lay upon the ground as if there had been a defeat, and the sorrow was general. The next day none of them died, but recovered their senses about the same hour they were seized, and the third and fourth day they got up as if they had taken physic."

Pliny ('Nat. Hist.,' xxi., c. 44, 13) describes a poisonous honey found at Heraclea, in Pontus, as being liquid, dark red in colour, and of a strong odour causing violent sneezing. When eaten it produced profuse perspiration, intense thirst, and the sufferer rolled upon the ground in agony. He attributed the poisonous action to the bees feeding upon a plant which he calls Ægolethron‡ (lit. goat's beard), and adds that in some years the same bees produce good honey. He also describes another kind which more nearly approaches in the effects it produces that mentioned by Xenophon. This also is found in Pontus, and on account of the madness it causes when eaten it is called "mænomenon." The poison in this honey he ascribes to a species of rhododendron.

The maddening effect produced by the honey of *Heraclea pontica* in certain seasons is also mentioned by Dioscorides, Diodorus Siculus and Aristotle. Strabo (lib. xx., c. 3) says that three squadrons of Pompey's troops were destroyed by the Heptacometæ, a wild tribe inhabiting the mountains east of Themiscyra. The soldiers were tempted with the honey, and were slain whilst under its influence.

Modern travellers have fully confirmed these reports as to the poisonous nature of the honey found around Trebizonde. Tournefort ('Letters from the Levant,' vol. ii., p. 168; and 'Hist. de l'Acad. Roy. des Sc.,' p. 351, 1704) says that honey made from *Chamærhododendron pontica maxima** stupefies the people who eat it, and that the smell of the flowers produces giddiness. He also quotes Father Lambert to the effect that in Colchis and Mingrelia the honey made from *Oleandro giallo*,† or yellow rose-laurel, causes vomiting, etc.

Mr. Keith E. Abbot, writing from Trebizonde under date December 10, 1883 (*Lond. and Edin. Philosoph. Mag.*, vol. v., p. 313) gives an account of the poisonous properties of the honey, but does not mention anything peculiar about its taste or smell. He adds that the poison is supposed to be derived from the *Azalea pontica*, which grows abundantly near, and when in blossom exhales a most luxuriant odour.

Hamilton ('Travels in Asia Minor,' 155. 1842) says that all the poisonous honey has a bitter taste. He describes both the purple rhododendron and the *Azalea pontica* as abounding along the southern coast of the Black Sea, and prefers to believe that the poison is taken by the bees from the odorous azalea rather than from the odourless rhododendron.

Still more recently Mr. A. Biliotti, H.M. Consul at Trebizonde, in his Report for 1879 (c. 2331, p. 1023), says that "bees are reared on a somewhat large scale in the province of Trebizonde, but the honey produced on the coast is unfit for food." He also adds, "It is presumed that the poisonous principle contained in the honey is gathered by the bees from the flowers of the *Datura Stramonium*, which grows in abundance on the coasts. Beehives, therefore, are only remunerative for their wax." In a more recent letter to Mr. Holmes, which accompanied the honey, he says that the tins were obtained from different parts of the district, and that he is informed that cattle happening to feed on *Azalea pontica* are taken with giddiness, as also are people who sleep with large bunches of that flower in their rooms.

These statements, reports, etc., would lead one to infer that more than one kind of honey possessing poisonous property is found in Asia Minor, and since Pliny, Dioscorides and others say that the bees which produce the poisonous honey, in some seasons produce good honey, it seems probable that the proportion of the toxic agent or agents varies from year to year, according to the character of the season. This appears to be confirmed by the fact that whilst one of the honeys received from Trebizonde undoubtedly contained a poisonous principle, it is probable that the other contained little or none.

It may be interesting to note here that poisonous honey has also been found in North America, and that in a district where the kalmia grows luxuriantly. According to Barton (quoted by Beck, 'Med. Jurisp.,' 2, 773) a party of adventurers in New Jersey tried bee-rearing in order to obtain honey. The bees throve splendidly and produced honey in abundance, but it proved to be of poisonous character, causing intoxication, dimness of sight, vertigo, etc., and in some cases vomiting, paralysis and death. Barton thinks the poison is derived from the kalmia, but also mentions andromeda, rhododendron, azalea and datura as possible sources.

The Trebizonde honey which I have examined

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, November 9.

† Spelman's 'Translation of Xenophon.'

‡ This, according to Sibthorp, is the *Nerium Oleander*.

* The *Azalea pontica* is doubtless the plant referred to.

† Hamilton ('Researches in Asia Minor,' Appendix B) points out that there is no yellow oleander, and that Lambert referred to the azalea.

was contained in hermetically sealed, cylindrical tins, holding about 7 lb. each.

Tin No. 1.—The honey in this tin was quite granular, fawn coloured, and with the usual agreeable characteristic odour. The flavour was at first like that of ordinary honey, but when the sweetness had passed off a certain degree of acridity could be detected even with small quantities.

The whole was placed in the water-bath until quite fluid, and then mixed with a gallon of 98 per cent. spirit. The clear solution which resulted was set aside to cool and deposit, the supernatant fluid decanted, the spirit removed by distillation, and the residue carefully evaporated to a syrupy consistency. This was treated with strong alcohol in exactly the same manner as the original honey, and the process repeated several times, until, in fact, nothing more could be separated. The final residue was a reddish brown pasty mass with powerful odour of honey, and a somewhat disagreeable and acrid taste. It did not dissolve entirely in water; the insoluble portion was of a complex character, containing apparently waxy, resinoid, and odorous principles, dissolving in chloroform, ether and alcohol. Beyond ascertaining that it contained no alkaloidal substance it was not further examined.

The aqueous solution had a persistent odour of honey, was dark brown in colour, and had a slight reducing reaction on Fehling's solution, which was much increased if previously treated with an acid. It gave with acids a distinct turbidity, precipitated slightly with neutral lead acetate, and most copiously with basic lead acetate. Not the slightest indication of the presence of an alkaloid could be obtained. The aqueous solution was faintly acidulated and agitated with chloroform, in which solvent the brownish precipitate produced by the acid was readily soluble. The chloroformic solution when evaporated left a brownish-red resinous looking residue, with a distinct odour of honey, readily soluble in dilute alkalies, forming a dark red-brown solution. This residue was set aside and labelled, "No. 1. extract, soluble in chloroform."

The acidulated fluid from which this had been removed was rendered faintly alkaline by the addition of sodium carbonate and agitated with ether, which became considerably coloured thereby. The supernatant fluid was drawn off and the ether allowed spontaneously to evaporate. The residue closely resembled that removed by the chloroform, and was labelled, "No. 2, extract soluble in ether."

With the aqueous solution which had been treated with chloroform and ether, numerous experiments were made to isolate some crystalline or otherwise definite principle, but with unsatisfactory results. After treating with lead acetate the solution was still deeply coloured, but the further addition of basic lead acetate seemed to throw everything out of the solution. The solution which had been precipitated by lead acetate, after removal of the lead, etc., yielded a brown uncrystallizable substance, which I could not resolve into more definite constituents. It seemed to be, or contain, a glucoside, was soluble in alcohol, slightly soluble in ether and chloroform; it gave no characteristic reactions with sulphuric acid, but with hydrochloric acid it yielded a fine green tint, changing to purple on applying heat. A similar but less distinctly marked reaction was obtained with both the ether and chloroform extractives.

Not wishing to waste the very small amount of material at my disposal by trying unnecessary experiments, I decided to suspend the further chemical investigation until I had ascertained in which extractive the poisonous principle, if any, was contained. The remainder of the aqueous solution was therefore evaporated to a low bulk and labelled "No. 3. Extract insoluble in Ether and Chloroform," and sent together with the extracts No. 1 and No. 2 to Dr. Stockman at Edinburgh for physiological examination. In these investigations the whole of the material was unfortunately used, so that further chemical examination is impossible without acting upon a fresh supply of honey.

Sample No. 2.—As the repeated treatment of the honey with alcohol, distillation, etc., was extremely tedious and troublesome to perform in my laboratory, my friend, Mr. W. A. H. Naylor, very kindly undertook to perform this part of the process for me. He reported that the tin contained $6\frac{1}{4}$ lbs. of honey, of the consistence of treacle and studded with small granules. It had a slight melliferous odour and distinctly acrid taste. By the treatment with alcohol he obtained a residue weighing about $\frac{1}{2}$ oz., and still containing a considerable amount of saccharine matter. This was removed as completely as possible by treatment with strong alcohol, etc., but much to my surprise the extractive obtained from it proved to be inert, and need not therefore be again referred to.

Dr. Stockman made very carefully a series of physiological experiments on frogs and rabbits with the extracts sent to him, and furnished a report from which I can only quote briefly, since the details are more suitable for a Physiological than a Pharmaceutical Society. He found that none of them affected the pupil of the eye, but that No. 2, when applied directly to the eye, caused almost immediately a violent attack of conjunctivitis. Administered subcutaneously Nos. 1 and 2 were inert, or if they contained any toxic substance it was in too small a quantity to produce any apparent effects. Extract No. 3 on the other hand proved to be exceedingly active, and therefore contained the substance of which we were in search.

A quarter of a grain of extract No. 3 dissolved in water and injected under the skin of a frog caused it rapidly to become paralysed, the animal lying in whatever position it was placed, the only sign of life one hour after administration being a very sluggish action of the corneal reflex. Respiration had entirely ceased, but the circulation went on vigorously until the evening of the third day, when it died. Two grains were similarly injected under the skin of a rabbit. Shortly after its gait became unsteady, and this effect increased until the animal appeared to have lost all control of its movements, and staggered about like a drunken man. One hour after it was lying down, unable to rise, and respiration had fallen from 104 to 46 per minute. Two hours later it had nearly recovered, the only symptom of poisoning being slight unsteadiness of gait, which shortly afterwards passed off. A dose of 4 grains killed a much larger rabbit in a very short time. From these and other experiments Stockman concludes that "the toxic substance contained in Trebizonde honey is evidently a narcotic poison, acting very markedly on the respiratory centre, by paralysis of

which death is caused." On comparing its action on frogs with the action of andromedotoxin, as described by Plugge (*Archiv d. Pharmacie*, [3], xxi., p. 16), there are certain points of agreement and disagreement. Both produce gradually deepening paralysis, and respiration is arrested, whilst the heart remains little or not at all affected; on the other hand, the violent vomiting movements, and the very marked fibrillary twitchings of the muscles observed by Plugge were absent.

The account given by Eykman of the effects on rabbits of asebotoxin (*Pharm. Journ.*, [3], xiii., 366) agrees with the results obtained from the honey extract, in so far as gradually deepening paralysis occurred, with death from failure of respiration. As Dr. Stockman could not obtain, at the time of writing, Eykman's original paper, a closer comparison was impossible.

Although our labours have not resulted in the isolation of the poisonous principle or principles, yet they enable us to speak with some degree of probability as to the nature and source of the poison. The reputedly poisonous plants growing near Trebizonde, and to which the toxic properties of the honey have been supposed by different writers to be due, are *Azalea pontica*, species of rhododendron and andromeda, *Nerium Oleander* and *Datura Stramonium*.

Since no trace of alkaloid could be detected in the honey, and the poisonous extract did not dilate the pupil, there is little doubt the poison is not derived from the *Datura Stramonium*.

Had the toxic agent been allied to the poison of the oleander we should have expected it to act as a cardiac poison, whereas it has little or no effect upon the heart. The little ascertained with regard to its chemical properties does not point to any relationship with neriin, oleandrin, neriantin or neriodorin; it is very improbable, therefore, that the poison is derived from the oleander.

The azalea, rhododendron and andromeda all belong to the same natural order, Ericaceæ, and the researches of Plugge, Eykman and de Zaayer point to andrometoxin or substances closely allied thereto as being the toxic principle in all poisonous Ericaceæ. There is now little doubt that the asebotoxin of Eykman and the andromedotoxin of Plugge are identical, and as shown by Stockman the physiological action of the poison of Trebizonde honey so strikingly resembles that of the above mentioned principles as to leave little doubt as to their close relationship if not identity. Both are glucosides, soluble in water, not precipitated therefrom by normal lead acetate, but thrown down by the basic acetate, sparingly soluble in ether, and giving a distinctive colour reaction with hydrochloric acid.

It is exceedingly probable therefore that the poison is derived from some Ericaceous plant, and as the azalea appears to be the most fragrant and abundant, so is it most likely to be its true source.

In conclusion, I must express my thanks to Dr. Stockman for his valuable assistance in undertaking the physiological experiments, and to Mr. Holmes, our Curator, for placing the honey at my disposal, and for his many interesting suggestions.

Supplementary Note by Mr. E. M. Holmes.

Since communicating with Dr. Thresh on the subject of Trebizonde honey, I have had the opportunity of consulting some other papers containing references to it, from which I have made the following extracts, in the hope that they may throw some additional light upon the origin of the poison :—

Curtis, in the *Botanical Magazine* for 1799, gives an illustration of *Azalea pontica* which had been introduced into cultivation the previous year by Mr. Anthony Hove, of Warsaw.

The plant at that date had been found by Tournefort on the eastern side of the Black Sea, by Mr. Hove on the northern side, and by Professor Pallas on Mount Caucasus.

Mr. Curtis quotes some interesting remarks from Mr. Hove's journal to the following effect:—

June 9, 1796.—Found a few of the species of azalea on the river Dnieper in swampy ground, four feet high, beginning to blow, called here the stupefying shrub, and considered by some as highly efficacious in curing *the venereal disease*.

June 20.—Found this species on the river Dniester (on the estate of Count Stanislaus Sczesny Potocki), about sixteen English miles from the town of Mohilow, in peat earth, from four to twenty feet high, regarded by the common people as *intoxicating*, and used in the cure of various diseases.

July 4.—Near Oczakow, found thousands of these plants, fully blown, in a marsh every springtide, overflown by the sea; found there also a Tartarian farmer who lived entirely by the profits arising from the honey which the bees extracted from the flowers of this plant, sold to Constantinople and other parts of Turkey for medicinal uses.

July 15.—Arrived at Trebizonde, found a valley, about ten English miles from the sea, covered with these plants (Xenophon's locality was twenty-four miles south-east of Trebizonde).

Mr. Curtis adds that "we have the best authority for regarding this plant as the *Chamærhodendron pontica* of Tournefort, for it agrees with his own specimens in Sir Joseph Banks' herbarium; it accords also with his description and figures, more especially of those flowers which are of a natural size; nor have we any doubts of its being the *Azalea pontica* of Professor Pallas, figured in the 'Flora Rossica,' since it corresponds generally with his description though not in all points with his figure, which bears evident marks of inaccuracy; the stigma, for instance, is represented as trifid.

The Rev. C. Wolley Dod, in a letter to the *Gardeners' Chronicle*, December 22, 1883, quotes a statement from a work entitled 'Treatise on the Commerce of the Black Sea,' published in Paris in the year 1787, in which the author mentions "that from Taman, at the eastern side of the entrance to the sea of Azov, come 500 quintals (equal to 25 tons) of honey collected in Abaza or Abassia, a region on the north-east coasts of the Black Sea, extending up the western coast of the Caucasus. The honey is cheap and bad, and produces in those who eat it frightful intoxication; it is called 'mad honey,' and its commercial value is for mixing with intoxicating drinks to increase their effects."

Mr. H. J. Ross, in the same volume of the *Gardeners' Chronicle*, p. 821, writes:—

"Having resided at Trebizonde, the scene of the poisoning by honey of Xenophon's soldiers, I can say that the chief undergrowth of that part of the southern shore of the Euxine, or Black Sea, consists now of *Rhododendron ponticum* and *Azalea pontica*, whereas no oleander grows on any part of that coast. The rhododendron has

little or no scent, whereas the azalea has a powerful and sweet odour. The flowers precede the leaves, and in spring whole hill-sides present sheets of golden-yellow, and the country is perfumed for miles around. The opinion of the natives is that the poisonous honey, called in Turkish '*Delli kal*,' or mad honey, is derived from these highly scented flowers of the azalea. The honey has a very peculiar, and to most people, disagreeable taste, in its crude state, and when eaten produces vertigo, sickness, purging, and great prostration; after many hours the effects pass off, and the sufferers gradually recover. The honey, nevertheless, is much used in cookery, confectionery, and for preserving fruits, being much cheaper than sugar; but previous to use it is cooked on the fire and the heat volatilizes the poisonous principle, when it can be eaten in safety. Whether the rhododendron is also poisonous I do not know; many think it is, and such was evidently the opinion of Xenophon."

Mr. H. Clarke, of Blenheim Gardens, Woodstock, states that eight sheep which ate rhododendrons, chiefly *R. ponticum*, in Syndall Park, Laversham, were found dead the next morning with the rhododendron leaves in their stomachs.

[*The discussion on this paper is printed on p.* 404.]

THE ALKALOIDAL VALUE OF IPECACUANHA CULTIVATED IN INDIA.*

BY FRANCIS RANSOM.

The success that has attended the introduction of the cinchona into India and Ceylon has naturally suggested the possibility of the profitable cultivation of other South American plants. Ipecacuanha, being a drug for which there is a large and steady demand, has received considerable attention for this purpose. It appears to have been first introduced into India in 1866, but for several years no encouraging results are recorded. During 1877 plants were distributed throughout the central and southern parts of the Peninsula, and the cultivation was also attempted in Burmah, Singapore and Ceylon.

In the same year Dr. King, the Superintendent of the Botanic Gardens, Calcutta, reports that the profitable cultivation of ipecacuanha as a crop at the cinchona plantations seems hopeless, owing to the cold of the winter season, even in the warmest valleys, being too great for a species so thoroughly tropical.

In spite of discouragement, continued attempts have been made, and an important fact relative to the cultivation was communicated by the Director of the Kew Gardens to *Nature* in the beginning of the present year. From a report on experiments carried out at the Government Cinchona Plantation at Darjeeling, it appears that two varieties of ipecacuanha, sent respectively from the Botanic Gardens at Kew and Edinburgh, have been introduced into India. Whilst those from Edinburgh have entirely disappeared, the plants from Kew, cultivated under exactly similar conditions, continue to live.

The latest information on the subject appears in the *Pharmaceutical Record* (Oct. 1, 1887), where it is stated that the experiments have proved that the plant flourishes best at Nilambur.

The value of the cultivated root compared with that obtained from the wild plants of Brazilian growth is a subject of interest and importance. Dr. King reported in 1877 that the Indian cultivated ipecacuanha had been used in the Medical College Hospital in Calcutta, and had been found to be quite as efficient as the best South American drug.

Mr. Holmes has recently placed in my hands a sample of the Indian root, which I have examined with the object of ascertaining its alkaloidal value. In appearance it closely resembles the drug imported from Brazil.

The method adopted for the assay was that proposed by myself at the recent meeting of the British Pharmaceutical Conference at Manchester (*Pharm. Journ.*, Sept. 17, 1887). It consists in percolating the finely powdered root with chloroform previously rendered alkaline by agitation with strong solution of ammonia, completing the exhaustion in an extraction apparatus with boiling chloroform, extracting the alkaloid from the percolate with very dilute sulphuric acid, and estimating the acid solution volumetrically with Mayer's reagent.

By this method I found 1·7 per cent. of emetine present in the root.

In my previous examination of the Brazilian drug I found that ten samples varied in value from 1·3 to 2·3 per cent. of alkaloid, the average strength being 1·66 per cent. As these were all, in appearance, fair commercial specimens, we may conclude that the Indian cultivated ipecacuanha is quite equal to the average Brazilian root.

It is to be hoped that before long it may become a frequent article in the London market, and that well-merited success may reward the enterprise and perseverance of those who have bestowed so much care upon its cultivation.

[*The discussion on this paper is printed on p.* 405.]

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, November 9.

FORMATION OF ALBUMINOIDS IN PLANTS.

Herr A. Emmerling states (*Landwirthschaftliche Versuchs-stationen*, 1887) that the total amount of nitrogen in plants increases during the first period of growth, especially in the leaves, until the commencement of the formation of the seeds. From this time it remains nearly constant in the leaves, but increases very rapidly in the fruits. The increase of albuminoids follows the same rule. The non-albuminous nitrogen decreases, as a rule, as the amount of albuminoids increases, especially in the seeds and seed-vessels; while in the leaves it retains nearly the same proportion until the seeds are ripe, but increases again during the last stage.

Of the non-albuminous nitrogen constituents of plants, the amido-acids occur in especial abundance in the leaf-buds, floral organs, young seeds and seed vessels. In the leaves the amount of these acids remains constant for a long period, increasing afterwards considerably; and this is the case also in the roots, seeds and seed-vessels. From this it is evident that the amido-acids found in plants are gradually transformed into other nitrogenous substances, and especially into albuminoids; and that the capacity of the plant to produce these acids decreases with age.

The course of the formation of nitrogenous substances, as seen in the case of the common bean, appears to favour the hypothesis that the amido-acids are formed synthetically in the plant, especially in the leaves, and that they are conveyed from these to the parts where fresh formation of cells is taking place, such as the growing points and the seeds, where they are then transformed into albuminoids. Since, therefore, it must be supposed that every young cell constructs the albuminoids of its protoplasm out of amido-compounds, the formation of amido-acids is a very important item in the process of metastasis.

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THE MEDICINE STAMP ACTS.

AMONG the statutes affecting members of the Pharmaceutical body, that relating to the stamp duty on proprietary medicinal preparations is perhaps more productive of inconvenience and annoyance than any other. Hence it is not unfrequently considered to be an oppressive enactment, and many are disposed to think that it might well be repealed. But when we come to examine the grounds upon which these opinions are founded, it is very frequently the case that they are found to be wanting in cogency. As a source of revenue the medicine stamp duty is not very important, since it does not produce, even with the licence duty, so much as two hundred thousand pounds annually. But its abolition could scarcely be effected without an equivalent taxation of some other kind, and it is not apparent what advantage would be gained by the change, when it is remembered that the greater part of the amount raised by the medicine stamp duty is collected in connection with the sale of quack medicines which appeal to that quality of human nature that has been said to characterize the majority. In such quarters no doubt the Government stamp is held to convey some authoritative recognition of the merit of preparations to which it is attached, but there is no kind of justification for such a belief, and so far as it may exist, it cannot constitute any ground for the abolition of the duty. At the same time chemists and druggists, in the ordinary course of their business, sometimes find themselves the subject of complaint on the part of the authorities charged with the collection of the stamp duty on account of infringement of the Act, and it is to occurrences of this kind that much of the adverse feeling towards the stamp duty must be ascribed. It is by no means uncommon that, to the persons concerned, the grounds on which such complaints are made appear trivial or even vexatious, but we think that in most instances it would be found on examination that this view has no real foundation. The authorities whose business it is to enforce the provisions of the Act must be credited with the fact that they have a somewhat delicate duty to perform; the provisions of the Act are so comprehensive that if they were rigorously enforced a host of articles could be made liable on which stamp duty is not demanded. And though it may appear paradoxical to say that the leniency with which the Act has been administered has been one of the main sources of the idea that hardship was inflicted in particular cases, the statement is not really far from the truth.

A case in point is furnished by the proceedings now being taken by the Board of Inland Revenue, in regard to the sale of certain pills in Scotland which, as will be seen from the following letter, addressed to the firm complained of, are sold under designations apparently conveying the idea that they are thus held out as nostrums or proprietary medicines or specifics:—

"Inland Revenue,
"Somerset House, London, W.C.,
"*November* 5, 1887.

"Gentlemen,—The Board of Inland Revenue have had under consideration your letter of the 13th ultimo, as to the sale in Scotland of Blaud's pills, etc., unstamped.

"The Board have no doubt that the use of such labels as 'Dr. Hamilton's Pills,' 'Dr. Christison's Pills,' 'Blaud's Pills,' etc., etc., bearing, in addition, the name and address of the compounder, must, in strictness, be regarded as indicating that those medicines are held out 'as nostrums, or proprietary medicines, or as specifics,' and that, therefore, medicine stamp duty ought to be paid in respect of them.

"The Board would not be disposed, however, to favour proceedings for penalties by reason of such medicines being sold unstamped, if in the case of remedies like Dr. Hamilton's pills and Dr. Christison's pills, the ingredients of which they are composed were specified on the label immediately before the word "Pills," thus:—

Ipecac. pulv.	1·3 gr.
Ol. eucalypt.	2·3 ♏.
Capsici pulv.	2·3 grs.
Pil. galbanm C.O.B.P.	1 gr.

or whatever the ingredients may be; but even with such a description they would come within the charging clause if held out by advertisements, hand-bills or otherwise, as specifics for complaints, etc.

"In the case of Blaud's pills, which are understood to be prepared in accordance with a formula appearing in the French Pharmacopœia, the Board would be willing to regard a statement to that effect on the label as negativing a claim founded on proprietary right, etc., or on the assumption that the pills in question may be regarded as a nostrum or specific.

"It will, of course, be understood that the view of the Board as above indicated only extends to the use of a lable printed in the manner suggested, and that in the event of the issue of any public notice or advertisement, or of any papers or handbills relating to the medicines referred to, the Board would consider it necessary to regard the matter in its purely legal aspect, and to maintain the liability of such medicines to the duty imposed by law.

"I enclose for your information extracts from the Acts of Parliament which impose and regulate the medicine stamp duties.

"I am, Gentlemen,
"Your obedient servant,
(Signed) "EDWARD BRIGHT."

To take for example the case of Blaud's pills, to use the name of an individual in the possessive form is considered by the Board to indicate proprietary rights in the same way that the names attached to many so-called patent medicines do.

But that, in fact, is not at all the case; there is no proprietary right suggested by the use of the name "Blaud's," which simply indicates that the pills so designated are of a particular kind, made according to a recipe that is not secret, but commonly known, and published in numerous works, official and non-official, precisely in the same way that the designations "Dover's Powders" and "Plummer's Pills" are popularly applied to preparations of the British Pharmacopœia. Moreover, the same pills are sold everywhere in England under the name of "steel pills," and the Scotch practice of using the prefix of the word "Blaud's" is the only circumstance in which there is any actual difference between their sale in Scotland and in England. We are now speaking from the point of view which is consistent with acquaintance with pharmaceutical matters, and in that light it must be admitted that there is some reason for looking upon the demand that Blaud's pills should pay stamp duty as being a harsh application of the Act. But it must not be overlooked that the matter also admits of a different construction when regarded in its purely legal aspect and without the aid of pharmaceutical knowledge, which the Board of Inland Revenue cannot be expected to possess. Hence the case is an embarrassing one on both sides. It may be gathered from the terms of the accompanying letter that there is an appreciation of the difficulty arising from such different views, and that by some alteration in the arrangement of the labels, a mutual satisfactory result may be arrived at.

It is important that chemists desirous of keeping clear of the application of the medicine stamp duty should be more careful to make themselves acquainted with the actual provisions of the Acts relating to it, and if that were done more generally means might, we think, be easily formed to avoid all difficulty. Mr. MEE's letter bears evidence that in his case that might have been done with advantage. The Somerset House decision that one of his labels would be liable to stamp duty seems quite intelligible, if due allowance be made for the way in which it might be regarded by the authorities charged with the administration of the law. Even then, it would have been easy to strike out the wording which rendered the label liable by indicating that the preparation was to cure a complaint. In like manner a study of the Acts, and of the expositions of them which have been so frequently given in this Journal, would have removed all occasion for complaint that the law is curiously unequal in its incidence, since effervescent salines are free from liability to stamp duty, while pills and narcotic preparations are taxed. In short, while there seems to be but little prospect or need of a repeal of the law in regard to medicine stamp duty, its provisions must be respected so long as they remain in force.

SYNTHESIS OF A SUGAR.

THE announcement from Würzburg that Professor FISCHER and Herr TAFEL have succeeded in preparing artificially a compound possessing the properties and having the composition of a true sugar—in fact, differing from glucose chiefly, if not entirely, in its behaviour towards polarized light—marks another important advance in the progress of organic chemistry. This synthesis is the outcome of a long series of researches which have been laid before the Berlin Chemical Society, and recorded in the *Berichte*, but its attainment probably first came within the range of perceptible possibilities during an investigation of the conditions attending the oxidation of polyatomic alcohols. Previously to this subject being taken up by Messrs. FISCHER and TAFEL, the products obtained as the result of such oxidation had, with one exception, been acids, the probability being that the aldehydes or ketones first formed escaped observation through lack of suitable methods for their separation. The exception, mannite, yielded to GORUP-BESANEZ a sugar that was named mannitose, but which has since been proved, by its behaviour towards phenylhydrazin, to be identical with lævulose. In consequence of this result, Messrs. FISCHER and TAFEL experimented upon other polyatomic alcohols; glycerine, erythrite and dulcite being oxidized with nitric acid, and phenylhydrazin being used for the detection of the aldehyde or ketone. This was an application of an observation made previously by Professor FISCHER, that the varieties of sugar which reduce alkaline copper solution form with phenylhydrazin crystalline compounds difficultly soluble in water and therefore easily isolated. The manner of formation of these compounds is represented by the following equation:—

$$C_6H_{12}O_6 + 2C_6H_5 \cdot N_2H_3 = C_{18}H_{22}N_4O_4 + 2H_2O + 2H.$$

Each of the three products of oxidation mentioned yielded a hydrazine derivative which corresponded in composition, manner of formation and properties, to compounds of phenylhydrazin with sugars. Glycerine, especially, yielded a beautiful crystalline product, having the composition $C_{15}H_{16}N_4O$, which seemed to have been formed, in all probability, from glycerine aldehyde ($CH_2OH.CHOH.COH$) or the isomeric ketone ($CH_2OH.CO.CH_2OH$), though it was not possible to isolate the aldehyde. It may be convenient to mention here that the term "phenyl-glycerosazon" has been applied to the glycerine derivative, the term being modified when applied specially to other derivatives, so as to indicate the origin of the compound.

In order to study more closely the origin of this glycerine compound it was determined to attempt to prepare glycerine aldehyd another way. To effect this acrolein was treated with bromine to form bibromacrolein, which was found to be easily attacked by baryta water, with the result that the bromine was replaced by hydroxyl radicles, the product being a very soluble substance that energetically reduced FEHLING'S solution, and possessed all the properties of an aldehyd-alcohol. It having been suspected that a sugar might be formed in this way, a preliminary attempt was made

to isolate such a product, if it existed, by means of phenylhydrazin, and this was so far successful that a substance of the osazon class was obtained, having the composition $C_{18}H_{22}N_4O_4$, and scarcely distinguishable from phenylglucosazon, the compound formed by glucose with the same reagent, except in being optically inactive. This result, at least, left little doubt that a sugar had been formed from the bibromacrolein under the influence of the baryta, and probably according to the following equation :—

$$2C_3H_4Br_2O + 2Ba(OH)_2 = C_6H_{12}O_6 + 2BaBr_2.$$

The next difficulty, therefore, to be overcome was to regenerate the sugar from the hydrazin compound, to which the name "phenylacrosazon" has been given to indicate its origin from acrolein. It was then found, in the course of purifying the substance resulting from the combination of phenylhydrazin with the products of the decomposition of bibromacrolein, that two isomeric compounds were present, one of them insoluble in ether, the other soluble in the presence of resinous impurities, but nearly insoluble when pure, and these were designated respectively α-phenylacrosazon and β-phenylacrosazon. Some of the α-phenylacrosazon, which was the preponderant constituent, was submitted to the action of reducing agents, resulting in the formation of a base which, when analysed as an oxalate, gave figures corresponding to the formula $(C_6H_{13}NO_5)_2C_2H_2O_4$. This base gave all the reactions of glucosamine ; it reduced FEHLING'S solution vigorously when warmed, but it was optically inactive. The neutral oxalate dissolved in ice-cold water was then treated with a calculated quantity of sodium nitrite and a little oxalic acid, which caused the evolution of all the nitrogen from the base. After this reaction had finished the liquid was exactly neutralized with soda solution, evaporated in a vacuum, and the residue extracted with alcohol, which left upon evaporation a sugar in the form of a light brown syrup, free from nitrogen or ash, having a sweet taste, reducing FEHLING'S solution very strongly, and combining with phenylhydrazin to reproduce phenylacrosazon. It has not yet been ascertained with certainty whether it is fermentable. In fact, the only point of difference yet observed between it and a natural sugar is that it is perfectly inactive towards polarized light.

An Evening Meeting of the Pharmaceutical Society of Great Britain will be held in the Society's House, 36, York Place, Edinburgh, on Wednesday evening next, when an Inaugural Address will be delivered by Professor A. Crum Brown. The chair will be taken at half-past eight precisely.

* * *

At a meeting of the Court of the Victoria University last week it was decided to admit the Yorkshire College of Science as a College of the University. Some little opposition appears to have been raised on the ground that the College is at present inadequately equipped on the Arts side, but after discussion this was withdrawn. This success is certainly subject for congratulation to those friends who have so persistently and ably worked to forward the interests of the College, and especially to the eminent pharmacist who so ably fills the office of Honorary Secretary.

* * *

On Friday, the 4th inst., the foundation stone of the new Newcastle College of Medicine, to be erected in the Bath Road, Newcastle, in the place of the old college, the site of which is required for railway extension, was laid by the Duke of Northumberland.

* * *

The latest report by the Board of Trade upon its proceedings and business under the Weights and Measures Act, besides being a record of more or less routine business, contains references to several other subjects of interest. In the first place, it is stated that representations have been made to the Board as to the want of a standard hydrometer, adjusted to the legal units of weight and measure, for determining the specific gravities of liquids heavier than alcohol, and the subject is still under consideration. Suggestions have also been made for the establishment of standards of one-sixth gallon (bottle), and one-twelfth gallon (half bottle), but it is thought undesirable to give official sanction to such measures in consequence of their near approach in apparent size to the imperial standard quart and pint. Similarly, the Board has had under its consideration the practice of making measures of capacity so as to appear to hold larger quantities than they really contain, and it is recommended that such measures should bear the verification mark in full on some conspicuous part. The appendix contains a quotation from a report of the St. Pancras inspector to the effect that the reduction of the fee for stamping glass measures from twopence to one penny has diminished the use in that parish of country marked glass, and tended to bring about the fulfilment of the intention of the Act by rendering the inspector responsible for the accuracy of the measures in use in his district. Lastly, the progress of the metric system is indicated by the statement that it has been brought into force in the Argentine Republic and in Finland.

* * *

The doubts first raised in this Journal as to the individuality of the substance put forward as a new anæsthetic alkaloid under the name "stenocarpine," have found confirmation in the announcement by Professor F. G. Nory, of Ann Arbor, that the preparation sent out as a 2 per cent. solution of stenocarpine consists essentially of 6 per cent. of cocaine hydrochlorate, 0·5 per cent. of atropine sulphate, and about 0·3 per cent. of salicylic acid. Professor Mohr also has examined fresh leaves of *Gleditschia triacanthos* with the same result as that attained by Messrs. Paul and Cownley in the examination of dry leaves, namely, failure to obtain the slightest evidence of the presence of an alkaloid. We have also been favoured with a letter from Professor P. W. Bedford, in which he informs us that the results above stated have also been obtained in the laboratory of Messrs. Parke, Davis and Co., of Detroit. When, therefore, we have added that according to the *Archives de Pharmacie* the leaves from which stenocarpine was supposed to be prepared were from a tree popularly known as the "*arbre couvert de larmes*," that being given as the French equivalent for "tear blanket tree," "stenocarpine" may be finally dismissed to the limbo of myths.

* *

The next meeting of the Chemical Society will be held on Thursday, the 17th inst., when there will be a ballot for the election of Fellows, and a paper will be read on "Zinc-Couple and Tin-Copper Alloys," by Mr. A. P. Laurie.

The Annual Conversazione of the Chemists' Assistants' Association will be held on Thursday evening, the 17th inst., at the Portman Rooms, Baker Street.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, November 9, 1887.

MR. JOHN ROBBINS, TREASURER, IN THE CHAIR.

The second evening meeting of the session took place on Wednesday, the chair being taken at 8 o'clock by the Treasurer, Mr. Robbins.

The first paper read was entitled—

Notes on Trebizonde Honey.

BY DR. J. C. THRESH.

The paper was followed by a supplementary note on the same subject by Mr. E. M. Holmes.

The papers are printed at pp. 397 and 399, and gave rise to the following discussion :—

Mr. Holmes said he had sent the honey to Mr. Thresh, owing to having seen a discussion in the *Gardeners' Chronicle* as to the plants which yielded the poisonous honey of Trebizonde, as he thought possibly the question might be settled by chemical examination. He therefore wrote to Consul Biliotti, who kindly sent him the two tins, which he forwarded to Dr. Thresh. After Dr. Thresh's paper was written he was able to refer to two books which that gentleman had not access to, and in these he found the supplementary notes, which might throw some light on the subject. The statement made by Mr. Ross that no oleander grows on any part of the coast he thought was a mistake. Mr. E. G. Baker, of the Herbarium in the British Museum, had informed him that although there was no specimen of the *Nerium Oleander* from that district in the herbarium there, nevertheless, from the statement as to its distribution given in Boissier's 'Flora Orientalis,' it was evident that the *Nerium Oleander* grew there. He might add that species of rhododendron were known to grow in the neighbourhood of Trebizonde. It was also possible that the second tin which was examined by Mr. Naylor had been subjected to so much heat as to effect the result alluded to by Mr. Ross, and to decompose the active principle. Wishing to know whether this honey was still an article of commerce in the East for preparing intoxicating drinks, he wrote to Mr. Zanni, Chemist to the Sultan at Constantinople, who said :— "We have two qualities of Trebizonde honey in our market ; the one is like several others, very good in quality, and is eaten like fine honey ; the other is not procurable, the sale being officially prohibited, because it contains a very poisonous principle. I have not had the time or opportunity to analyse this honey, but I hear from an *employé* of mine, who is a native of that country, that he has been a witness of its poisonous effects. It is stated that it causes the same inebriate phenomena as excess of alcohol. Several respectable persons have assured me that secretly beverages are made with this honey, producing the pleasures of alcohol and of haschish."

The Chairman said no doubt many would be astonished to hear that honey from any part of the world was poisonous, and it seemed rather curious, ericaceous plants being so widely distributed, and bees being so fond of them, that the same results were not found elsewhere. He had seen in the papers that honey had been found to be poisonous at New Jersey, and it was remarkable that in America it should be confined to that locality.

Mr. Naylor said it had occurred to him, previous to hearing Mr. Holmes's suggestion, as highly probable that the difference observed in the extracts from the two honeys might be accounted for by some slight but important difference in the mode of treatment. In treating nearly 7 lbs. of honey with a large quantity of absolute alcohol, the operation being repeated from fifteen to twenty times before the whole of the saccharine bodies could be removed, and the alcohol repeatedly distilled, it occurred to him that it was just possible the poisonous principle might be a volatile one, in which case it might pass over with the alcohol. On hearing the paper he thought very likely Dr. Thresh had simply evaporated the alcohol in a large basin at a much lower temperature, though he did appear to suppose that the poisonous principle was volatile. The honey he extracted was distinctly acrid, and so was the alcoholic extract, more so than the honey itself. A great deal depended on manipulation, and no doubt the poisonous principle only existed to a very small extent in the honey.

Mr. Shenstone said an instance had occurred a few months ago which might possibly confirm the idea that English rhododendrons were poisonous. He had the contents of the stomachs of some sheep brought to him by a veterinary surgeon, with the statement that the sheep had tumbled down apparently in fits, and some died, though a good many recovered. The contents of the stomachs were almost entirely evergreen leaves, which had the appearance of rhododendrons, though some looked more like a kind of laurel. He proposed going to the spot to endeavour to identify the leaves, but the owners of the sheep did not think it was worth while, and the matter dropped, but he would make further inquiries, both as to the symptoms, and also as to whether rhododendrons grew abundantly in the neighbourhood.

Mr. Thiselton Dyer remarked that in the paper one of the earlier writers was quoted as stating that the rhododendron was probably the source of poisonous honey ; but it was quite possible that an erroneous conclusion might be drawn from a mistake in nomenclature. Amongst the Greeks the oleander was called either nerion or rhododendron, and the rhododendron of the sixteenth century herbalists was also the *Nerium Oleander*. He should be rather disposed to think that the *Azalea pontica* was the most likely source of the poisonous quality of the honey, but there was no doubt that the oleander occurred in the Trebizonde region, though he should hardly think it would be as abundant there as it was in some parts of the Levant. Anyone who had read Dr. Stanley's books on the Holy Land would remember his vivid description of the oleander as filling the dry river courses in Syria, and it seemed to extend along the southern coast of Asia Minor, but he should be inclined to think that although it did occur on the confines of Armenia, the southern shores of the Black Sea would be less favourable to it, and that it would be hardly likely to furnish an abundant source of honey. He had looked up one or two accessible books on this subject, and had found a case reported of a child being killed from eating the flowers of the oleander. It was quite possible, therefore, if the oleander existed in quantities, and the bees visited it, that this might be the source of the poison ; if the corollas of the oleander were so virulent the honey might have some poisonous effect. But one was always accustomed in considering the collection of honey to look for some plant which existed in very large quantities, and he thought, on the whole, the *Azalea pontica*, which occurred very largely in the neighbourhood of Trebizonde, was more probably the cause of the toxic effect than any of the other plants mentioned.

Professor Attfield said it was Pliny who attributed the poisonous action to the bees feeding on a plant which he called ægolethron, which according to Sibthorpe was the *Nerium Oleander*. He hoped the discussion would not close without a vote of thanks to Drs. Thresh and Stockman, and also to Messrs. Naylor and Holmes, for the work they had undertaken, and also of sympathy with them that apparently so little result had flowed from it. It was a thankless task to work at any subject which had been partially worked out previously, but it had to be done, and obviously it could be done better by several than by one. Here they had had a chemist, a botanist, a physiologist, and a wholesale manufacturer, all contributing to the elucidation of the subject, and he would

venture to express the hope that all these gentlemen would continue their labours and give the Society the benefit of their researches at some future time.

Mr. HOLMES was glad to find from Professor Dyer's remarks that, from a botanical as well as a chemical point of view, the chances were against the honey being obtained from the *Nerium Oleander*. As far as the evidence went, it was to the effect that *Azalea pontica*, and probably some species of rhododendron, was the source of the honey. *Datura Stramonium* was fertilised by moths, and it seemed highly improbable that it was the source of this honey. Mr. Baker in his letter remarked that the oleander was abundant in Italy, and probably the honey was often taken from it by bees, but it did not seem to be poisonous there. In this country aconite was constantly sought after by bees, but the honey thus obtained did not produce the effects of aconite. There was therefore evidently something to be learned on this subject.

Mr. MARTINDALE said he should have expected that some of the Solanaceæ, like the datura, would most likely have been found to be the cause of this poisonous principle. In India and various countries it was used as an intoxicating agent as a kind of drug like coca or maté. In this country an immense deal of the honey was collected from ericaceous plants, like the heather.

Mr. HOLMES said Dr. Thresh had shown in the paper that the honey in question produced no dilatation of the pupil.

The CHAIRMAN then formally proposed a vote of thanks to Dr. Thresh, Dr. Stockman, Mr. Naylor and Mr. Holmes, which was carried unanimously.

The next paper read was entitled—

THE ALKALOIDAL VALUE OF IPECACUANHA CULTIVATED IN INDIA.

BY FRANCIS RANSOM.

This paper is printed at p. 400, and gave rise to the following discussion :—

Professor THISELTON DYER said this communication, although very brief, was one of the most interesting which had been made in connection with pharmaceutical research for some time. The story of the attempts made to introduce the ipecacuanha plant into India was a very long one, the first effort, as was stated in the paper, being in 1866, when Dr. King, then Assistant-Surgeon in the Bengal army, successfully conveyed to India by the overland route the first plant of this invaluable species. That plant came from Kew, and as far as he could make out, for he had not been able to investigate the question thoroughly, it was the only survivor of a case of ipecacuanha plants which some time previously had been obtained from Brazil. The Government of India attached enormous importance to the introduction of ipecacuanha into that country, and looking at the almost specific character of this drug in the cure of dysentery, their desire to see it acclimatized was amply justified. The history of the plant was carefully recorded till it died in 1868. During that interval, however, nine plants had been obtained from it by propagation at the Calcutta Botanic Gardens, and five others which were cultivated at Darjeeling, so that in 1868 there was a total stock of fourteen plants in India. In 1871 the five plants at Sikkim has been increased to 400. Dr. Anderson, to whose intelligence and enterprise the cultivation of ipecacuanha was largely due, and who pressed the subject very vigorously on the Government of India, being then superintendent of the Botanic Gardens, Calcutta, came to this country in 1870, and used every effort to acquire every ipecacuanha plant which was to be had. There had always been a very distinguished pharmaceutical school at Edinburgh, under the auspices of Sir Robert Christison, where everything appertaining to pharmacy was a matter of great interest, and at the Botanic Gardens there was a notable collection of medicinal plants. Amongst others was ipecacuanha, and Dr. Anderson obtained all they could spare. He also obtained a supply from Kew ; meanwhile, however, he died. But propagation had been carried on in Edinburgh, and 250 plants were sent out. This might be said to be the seed sown a quarter of a century ago, which had been quietly germinating in India, until that evening they were in a position to sample the first harvest. It had been an exceedingly arduous process, and rather a discouraging one. More than once those whose duty it was to cultivate the plant had been very much inclined to give up the task as hopeless. Ipecacuanha was perhaps more depressing to cultivate under adverse circumstances than any other plant on account of its slow growth, and the general wiryness of its appearance ; but at every point when the cultivators began to be despondent something had happened which encouraged them to proceed. The first difficulty met with was the extreme tardiness with which these plants could be propagated ; in two years they only got fourteen from one plant. There were four original plants altogether in India, and up to 1873, with every effort and with all the additional supplies obtained, the total number was something under 7000. That represented something like eight years' work, and of course, from a commercial point of view, it was not very encouraging. Then it was discovered by the late Mr. McNab at Edinburgh, a very accomplished cultivator, that the rhizome of this plant could be cut into infinitesimal portions, and that every one of these would grow and form a plant, and when this discovery was applied in India it led to an enormous increase, so that in a short time the number of plants rose from 7000 to something like 63,000. At the Cinchona plantation, in Sikkim, there was a clever young gardener named Jaffrey who devoted himself to the ipecacuanha ; and it was mainly through his exertions that this enormous advance was made. Another discovery was also made at the Edinburgh Gardens, by Mr. Lindsay, the present Curator, who found, what no one would have expected from such a plant, that a single leaf if plunged into damp sand would develope buds and roots. That method of propagation was not so successful, however, in India as from the rhizome, but still it was used to some extent. Up to about 1875, as far as methods of propagation were concerned, the future of ipecacuanha was secured, but the cultivation had to be carried on almost entirely by artificial means, under glass in houses or frames, and notwithstanding all the pains devoted to it, it had not assumed anything of a commercial character, because, of course, under such conditions medicinal plants could never be produced at a price which would make them available in such large quantities as the Government contemplated. However, it was found, as mentioned by Mr. Ransom, quoting from a short note he sent to one of the scientific journals early this year, that as cultivation under glass could not possibly be carried on extensively the attempt was made in Sikkim to plant it in shady places under trees. It was a plant exceedingly sensitive to anything like fierce sunlight or dry atmosphere ; it was in fact a characteristic kind of tropical undergrowth. This led in Sikkim to a very curious result. There was no doubt that the original Kew stock came from Brazil, and though he had not been able to ascertain exactly the channels through which it came, he had no doubt that pains were taken to get it from someone who would authenticate it as being the true ipecacuanha plant. It was rather doubtful what the history of the plants cultivated in Edinburgh was; about 1832 was the date of the first introduction of ipecacuanha into Europe, and one could not perhaps exactly say from what source the Edinburgh plants came, but probably from Brazil. But what the extremely intelligent superintendent of the Cinchona plantations at Darjeeling said was, that these plants, which were sent out as apparently the same thing, had certain tangible differences, by which to the trained eye of the cultivator they could be distinguished, and they could always tell

which were the Edinburgh strain, and which the Kew strain. Probably, as constantly happened in cultivated plants, there were several forms or races of ipecacuanha, and they had been imported through two or three channels, and were not precisely the same kind. The curious fact was, that although in Dr. Anderson's importation the plants from Edinburgh considerably outnumbered those sent from Kew, yet the Kew plant happened to have greater constitution and vigour; it increased and multiplied, whilst the Edinburgh apparently eventually died out. He should be the last to say that that was owing to any merit on their part at Kew, but it was interesting with regard to the future of the drug, because knowing the trouble there was to critically determine the physiological differences in cinchona which accompanied small variations of a morphological kind, it would be more interesting to know that the ipecacuanha supply of India was derived from one definite source than from several varieties. He did not gather from the paper that the precise source of the present sample was exactly ascertained. He thought Dr. King as early as 1876 was able to submit to the medical service in India some dried root which had been grown in that country, which was tried in hospital practice, and found to be quite as good as the Brazilian drug. In 1877 Dr. King supplied 26 lbs. of the root which had been grown in frames, and this was found satisfactory. No doubt the ipecacuanha would be kept alive in some suitable place in Sikkim, and in some places also in Southern India conditions would be found favourable for it; but the most promising thing in regard to its cultivation in the old world was a report from the Forest Department of the Straits Settlements for 1886. Mr. Cantley, who had the superintendence of affairs, wrote:—"The ipecacuanha is a native of Brazil, a plant which has been found generally very difficult to cultivate. It seems to grow in the Straits with all the luxuriance of its native country, when a proper situation is hit upon; it enjoys a very moist still atmosphere and somewhat dense shade. In that situation it forms a compact little shrub of about eighteen inches in height, and is very ornamental when well in flower. I lately visited a plantation of the plants in Johore, and saw thousands of plants in excellent health, protected from the sun by palm leaves laid on an artificial stage six feet in height, and the edges of the same a few yards apart. The soil is of a rich character." It would therefore appear to him that it was quite possible that in the State of Johore, and some other places in the Straits Settlements, there was a climate which was quite suitable for the cultivation of this plant on a large scale. In conclusion he would only say that it was extremely satisfactory to see the way in which the persistency which was so characteristic of the best English work had been rewarded in this case with ultimate success. He knew nothing in the whole field of botanic enterprise which exceeded the admirable persistence with which the Indian botanists and pharmacists had stuck to this business, and had gone on cultivating this plant for very nearly twenty years, with very little encouragement, until the last few years. Mr. Cantley, of the Cinchona plantation at Darjeeling, when success seemed a little more in sight, wrote to him, saying that this illustrated the importance of never losing heart in work of this kind. You must not be disheartened by failures, but try new conditions, and adjust the circumstances to the varying places in which the plant is grown, and in the great majority of cases you would ultimately succeed. Being very much occupied he could not often hope to take part in these interesting discussions, and therefore he desired to add a word in support of what had been said by Professor Attfield as to the extreme usefulness of the work done there. He could assure the Society and the members there was no more assiduous student of the Journal of the Society than himself, and if he had not often the pleasure of assisting at the discussions he had the advantage of reading them. He knew no scientific work in that great city which seemed more adapted to the end it had in view, or which more successfully attained that end, than the discussions and operations of the Pharmaceutical Society at its scientific meetings. He could not but admire the enthusiasm with which the work was carried on, and the ability with which its success was achieved.

Mr. HOLMES said he had listened with the greatest interest to the valuable account of the history of ipecacuanha which Professor Dyer had given, and his later remarks had thrown a flood of light on a point of great difficulty which he had experienced. When a fresh product came to this country the merchants who imported it were very reticent as to the exact locality whence it came, and very often tried to mislead one if possible—that was the case with this ipecacuanha. He was told that it came from India, but that nothing could be learnt about it. However, on seeking the drug broker he was told that the packet which came over was about 10 lbs., that it appeared to be a trial sample, but that instead of coming from India it came from Singapore. He had no doubt now that it came from that flourishing plantation which Professor Dyer had spoken of. As far as one could see from what had been said about the habit of the plant it might be grown equally well in Burmah. The broker who had the sample recognised the difference between it and Brazilian ipecacuanha by the presence of the minute fibres, these being always removed from the Brazilian samples, and to commercial men minute differences of that kind often give a practical clue to the source of the drug. With respect to the ipecacuanha grown at Kew and that grown at Edinburgh he should be glad to learn if any record had been kept of the botanical characteristics of the varieties cultivated at either of those places. He believed the ipecacuanha was a dimorphic plant, and possibly either a long-styled or short-styled variety might have succeeded where the other did not. Again, the exact temperature and the conditions under which it flourished at Singapore would be no doubt published and made use of. He had to thank Mr. Ransom for the readiness and promptitude with which he undertook the examination.

Mr. MACEWAN said he knew there was in the Library upstairs a paper contributed by the late Professor Balfour to the Botanical Society, Edinburgh, with regard to the ipecacuanha in the Edinburgh Gardens.*

The CHAIRMAN proposed a vote of thanks to Mr. Ransom for this valuable paper. Ipecacuanha was a very important drug, and although it was not necessary to separate the alkaloid as often as in the case of many other drugs, it was well to know the quantity present if one required to separate it. The paper would be especially valuable to those in India who were now cultivating it, and when it was found that the Indian was equal to the Brazilian article it would no doubt give an impetus to the industry. He would include in the vote of thanks the name of Professor Dyer, who had given such an excellent history of the cultivation.

The vote of thanks having been carried unanimously was briefly acknowledged by Mr. Ransom.

Mr. CHRISTY then drew attention to a quantity of strophanthus which had arrived from a new port, and thought it might be interesting to the meeting to know what had been done in this drug during the last year. The first year the quantity of seed which came from Africa was 1840 lbs. with 450 lbs. of pods, estimated to yield about 153 lbs. of seed, so that in the whole year there came to the United Kingdom 1493 lbs. of strophanthus seed, and to the United States he had traced about 200 lbs. Considering the very small dose that was required, it would be seen with what great pleasure medical men had been able to receive this drug, and work with it. It had been mostly the kombé

* See *Pharmaceutical Journal*, [3], vol. ii., p. 948.

variety. At first it was thought the variety sent over was the hispidus, and having received the first shipments, he was able to say that it was a variety which had been called hispidus, viz., the brown seed. Within the last fortnight he had received from the Niger the first shipment of pods and seed, which he sent specimens to Mr. Holmes, and these turned out to be a brown seed with a brown velvety appearance like hispidus, but not the same variety as received originally. Having been accustomed to taste the different seeds as they arrived, he could state that this hispidus variety was much more powerful than any of the kombé seeds, at any rate, much more intensely bitter; though whether it would obtain a greater percentage of the active principle had yet to be determined. He was informed that in the valley of the Niger large quantities of this were growing, so that further supplies might be expected. It would be also interesting to know that for some reason which at present he was unable to fathom, the French had decided that hispidus should be the standard variety, notwithstanding the many satisfactory experiments made both in this country and in Germany with the kombé. He had received from Sumatra a seed pod said to be a variety of strophanthus, and it was very singular that the plume was reversed, exactly the same as in the case of the seed sent from Natal, but quite a different shaped pod. The seeds of kombé which he had sent out to try and get cultivated were doing remarkably well on the West Coast of Africa, Java, Ceylon, and in Southern India, so that in the course of a few years they would not be dependent on the interior of Africa. Another collector of his, a native, had sent a plant which had a pod exactly like one of those sent to him of the kombé variety, stating that it was also one of the arrow poison plants. He sent one to Mr. Holmes, but the pod was in very bad order, and he thought the leaf was hardly like strophanthus. It would be very interesting to be able to get from medical men the result of experiments with the tinctures made from these different seeds.

Mr. HOLMES said the seed of the specimen Mr. Christy had just referred to looked very much like that of *Strophanthus hispidus*, but the leaves were quite different in character, and probably belonging to some other species, although evidently nearly allied to *S. dichotomus*. The pod however was somewhat smaller than the strophanthus received before. The mounted specimens of strophanthus leaves on the table had been received from Mr. R. Lindsay, of Edinburgh, to whom he had sent the seed of the different commercial varieties in January last. The specimens had been grown from the seed sent. Curiously enough he had obtained two different plants from what had been regarded in commerce as one kind of seed. It appeared therefore that collectors in Africa were not particular as to the species from which they collected, so long as they were strophanthus pods at all. Mr. Christy was mistaken in supposing him to say that the leaves of his plant were not those of strophanthus; they were evidently strophanthus leaves, but not those of *S. hispidus* or *S. kombé*. The exact species could only be determined by the examination of flowers and plants in good condition. Some roots Mr. Christy kindly sent to him a short time ago had a very peculiar undulating appearance, and a few days after from another source he, the Curator, had received some roots of *S. hispidus* which were exactly the same as those of Mr. Christy's plants, although the very different leaves of the second specimen were evidently those of *S. hispidus*. Whether the roots contained the same active principle as the pods, and in a larger or less quantity, would be a matter for experiment. A portion of the root had been handed to a chemist who was competent to determine this point.

Mr. COLLIER said the strophanthus was an entirely new drug, and of course every one wished to try it, which accounted for the demand for it. He had the opportunity of observing it in use, and he might say that at first a considerable quantity was used at Guy's Hospital, but its use had now fallen off very much. He did not think it was likely to replace digitalis. They used remedies of this kind very largely, perhaps four pints of tincture of digitalis in a month, but they certainly had not used two pints of tincture of strophanthus since it was introduced.

Mr. ROBINSON remarked that the dose of tincture of strophanthus being so much less than that of digitalis, it would be necessary to multiply the quantity used by three in order to make a comparison.

Mr. COLLIER did not think that in the last three weeks any strophanthus had been dispensed at all; although at present there were, he should think, forty or fifty patients who were taking digitalis.

The CHAIRMAN said this new drug might be very important, whether it was now used largely or not. It was being examined scientifically, and although all its uses might not yet have been discovered, the examination it was undergoing by different persons might lead to its use in some other direction. He heard Professor Faraday say once that he never regarded the commercial value of anything he was investigating, as generally there was no use to be found for it, but ultimately it during the investigation frequently became of great importance; and this remark might possibly apply to strophanthus. It was a new drug, of which he knew very little himself, but as a number of people were experimenting with it he had no doubt a use would be found for it.

Mr. CHRISTY said he had now one or two hundred plants growing at Sydenham from all the different seeds he could collect commercially, and he had several different varieties growing from the same seed apparently, the leaves of which showed exactly the same characters as the leaves Mr. Holmes exhibited that evening.

The CHAIRMAN then proposed a vote of thanks to Mr. Christy, which was carried unanimously.

DONATIONS TO THE MUSEUM.

Mr. HOLMES then drew attention to the following specimens on the table:—A very fine collection of Chilian drugs, presented by the Director of the Royal Gardens at Kew. Amongst them were several which might be regarded as replacing in Chili various drugs or herbs used in Europe. In this collection there was a specimen of the drug recently introduced into this country under the name of pichi, and which consisted of stems and leaves of the *Fabiana imbricata*, a plant which had the appearance in leaf of the common heath, but in the flower was quite different in structure, and was intermediate in appearance between an *Erica* and a *Cestrum*. The specimen of spurious chiretta on the table had been presented by Mr. Elborne, who detected it as not being the genuine article. It had a general resemblance to the true drug, but the taste was perceptibly different, being much less bitter. The stem also was of a pale colour, and had four narrow-winged arylls, and the leaves, when they could be obtained entire, were evidently more obtuse. Amongst other specimens from Kew was a bark of a tree from the Cape Colony, used for making bitters in the same way as Angostura is in this country; this bark was derived from *Gonioma kamassi*. There was also a specimen sent him by the Rev. A. J. Lennard, a Wesleyan missionary in Griqualand, of a root which was much used there for dysentery. The root appeared to be that of an umbelliferous plant, but as he had neither flowers nor fruit it was impossible to identify it. He was promised a large quantity of the root for chemical examination. There was also a specimen of sandal wood oil, which Mr. Umney had been kind enough to distil from a log of Fiji sandal wood exhibited at the late Colonial Exhibition, and subsequently presented to the Pharmaceutical Society. It yielded an unusual percentage of an oil which appeared to be of good quality. Dr. E. Harry Fenwick had promised to experiment with it and to report as to its therapeutic value as compared with

the Indian sandal wood oil. Another specimen of sandal wood oil on the table was sent him by Dr. Bidie, of Madras. Usually, sandal wood oil was distilled in a very rough way by the natives in India, and sometimes had fixed oils mixed with it, and not being satisfied that the specific gravity given in the text-books was correct, he had asked Dr. Bidie if he could procure him a sample distilled by a chemist in Mysore which could be guaranteed as perfectly pure. This specimen had been specially distilled for the purpose. The Curator said that he would be happy to hand a portion of it to anyone who would undertake to determine its specific gravity, and any of the physical and chemical properties of the pure oil. A specimen of strophanthin was upon the table, but of course was only in small quantity. He next called attention to a very liberal and valuable collection of rare chemicals, presented by Dr. Theodore Schuchardt, of Görlitz; amongst these were the new metal, germanium, also gallium, tellurium, crystalline selenium, keratin, large crystals of asparagin and vulpinic acid and other specimens that might be interesting to chemists. There was also a specimen of mannite in crystals, finer than any previously had in the museum. Some gentlemen present would remember the paper by Mr. Braithwaite at the British Pharmaceutical Conference on "A New Variety of Cantharides," in which it was stated that a sample of cantharides sent to this country from Cape Colony, consisted of two species of *Mylabris*, *M. bifasciata* and *M. lunata*, the former being very active, and the latter containing very little cantharidin. Mr. Braithwaite had presented a sample of cantharidin obtained from the former insect. Dr. Schuchardt, who had since obtained some of these insects from the Cape, said that not only was the percentage of cantharidin larger than from any other source, but that it crystallized out in larger crystals than he had hitherto obtained from Chinese cantharides. Mr. Williams had sent a specimen of crystalline aconitine from *A. Napellus*, and of pseudaconitine from *A. ferox*. Mr. Braithwaite had that evening brought in a specimen of *piperine* in fine crystals, which he and Mr. Farr had prepared. A valuable series of salts of one of the rarer of the opium alkaloids had been presented by Messrs. J. A. Wink and Co.; another series of specimens had been presented to the Conference by Messrs. Merck of Darmstadt, and by Messrs. Von Heyden and Co., through Mr. Helbing; these included all the new antipyretics, hypnotics and antiseptics. He would not detain the meeting by a detailed reference to their properties and uses, but would point out that two papers had been published in the Journal concerning these new drugs, one by Mr. Helbing, the other by Mr. Dymond, the former being a paper read at the recent British Pharmaceutical Conference, the latter before the Chemists' Assistants' Association. The specimens of the oil of *Pinus Pumilio*, or mountain pine, well known as Carpathian balsam, upon the table, deserved notice from the fact that the use of the oil as an inhalation in throat diseases and external application appeared to be increasing. It was supposed to be superior to the oil of *Pinus sylvestris*, but that might be a matter of taste. It was, however, a difficult matter to obtain genuine oil of *P. sylvestris*; the oil sold under that name was often obtained from the wood of other species as a waste product in the manufacturing of paper from wood in Norway and Sweden. Another series of the specimens now exhibited consisted of herbs, roots, etc., largely used in this country, but which had hitherto been desiderata for the Museum. These had been presented by Messrs. Potter and Clark. Finally he called attention to specimens of saccharin. For this product many new uses were daily being found. It was stated to be two hundred and fifty times as sweet as cane sugar coffee. He was told that 3 grams were sufficient to pleasantly sweeten a pint of tincture, and that it was two hundred and fifty times as strong as sugar. Although pleasant when diluted, it was not advisable to taste the saccharin in its pure state.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 2nd instant.

Present—The President, Mr. J. E. Brunker, M.A., in the chair. Messrs. Allen, Grindley, Dr. Collins, Beggs, Wells, Minchin, McCormack, Charles Evans, Doran, Hayes, Professor Tichborne, Simpson, and Dr. Montgomery.

The first business was the reception of a deputation from the chemists and druggists of Belfast.

The deputation consisted of Messrs. Clothworthy, Rankin, Gibson, and Shaw.

Mr. Clothworthy said he believed the members of the Council were already aware of the grievances complained of. There had been prosecutions of chemists and druggists in Belfast, some of which had been sustained, whilst others had failed. The Act of 1875 saved the rights of a number of chemists and druggists, of whom he was one. A number of their *employés* had since come into trade, and these young men, he submitted, had a right to complain of their present position.

Mr. Rankin said the feeling of the deputation, and of those whom they represented, was that their proper course was to come before the Council and endeavour to have the grievances of which they complained rectified in a legitimate manner. He was one of those who had gone into business since 1875. Strong sympathy was felt in Belfast for their position, the Act containing no provision for a Minor examination, by passing which they could obtain a legalised position without going up to the higher examination. After the late prosecutions some of them stopped the sale of poisons—the right of doing so being the thing for which they were contending—while they had never dispensed prescriptions, nor did they want to do so. Several meetings of chemists and druggists of the old and the new classes had taken place in Belfast, and it had been decided at the last meeting that a deputation should come there. At that meeting the following resolutions were passed :—

1. The deputation wish to bring before the Council the injustice that was done to assistants and apprentices who were with chemists and druggists at the passing of the Act of 1875, some of whom have gone into trade since.
2. The traders here understand that there is a general impression that provision should be made by Act of Parliament to establish the second grade contemplated by the Act of 1875, whereby upon the passing of a minor examination dealers in drugs and poisons should be legalized.
3. The deputation will ask that steps should be taken to obtain power from Parliament to give effect to this. Traders and assistants here would be glad to join the Council to procure this both by influence and money.

When he spoke of those who had gone into trade since the Act of 1875, he referred only to legitimate assistants of chemists and druggists who had served their time to the business in connection with the association in Belfast. A list of those who desired to be qualified was in the hands of Sir James Hazlett, the Mayor of Belfast, who had been unfortunately unable to accompany the deputation, as he had intended to do. Some of them had inherited establishments from their fathers, and they were now in a very awkward position. It had been seen from the reports of the proceedings of the Council in the Journal that some legislation on the subject was intended; and the members of the deputation were authorized to state that the chemists and druggists of Belfast, and of the north of Ireland generally, would support the Council both by influence and money in any action that they should take with that view. The trade of Belfast, both wholesale and retail, were in strong sympathy with the

views of the deputation, and letters had been received from a large number of the pharmacists of Great Britain in support of their views. He (Mr. Rankin) knew that a great number of them were of opinion that there should be two grades, one for the finer work and the other to carry on the business in rough drugs, paints, oils and colours, which their pharmaceutical brethren did not want.

Mr. Gibson also addressed the Council, and said the deputation represented not only the chemists and druggists who had been in business at the passing of the Act of 1875, but also those who had since got into business on their own account. They asked the Council to carry out what they believed to have been the spirit that animated the framers of the Act of 1875, namely, that a second—or inferior grade, if they should please to call it so—should be formed. The Council had already said that they could not do so under that Act, as it at present stood. If that were so, the deputation wished that they should get a new Act authorizing the creation of a second grade, who should be entitled to sell poisons without exercising the other functions of pharmaceutical chemists. They did not want the right to fill prescriptions, because they were of opinion that nobody should be allowed to do that unless he had passed the examinations at present prescribed by the Council. But they thought that the intention of the Act of 1875, as expressed in the preamble of it, which said that it was an Act to institute a Pharmaceutical Society, and to regulate the qualifications of pharmaceutical chemists and of chemists and druggists in Ireland, had not been carried out by those to whom the duty of administering it had been entrusted. The deputation were aware that the Council had inherited difficulties which they thought rendered it impossible for them to establish the two grades; but they promised that if the Council got a fresh Act passed, they would receive their cordial sympathy and support. They thought the Council had not realized the important fact that the two classes of persons were absolutely necessary—the one to do the finer work of filling prescriptions, and the other for the heavier and rougher trade, which they knew from experience was the worse paid of the two. The idea of the predecessors of the Council had been, contrary to the intention of the Act, to blend the two grades into one. An experience of twelve years must have taught them that that was an impossibility. The true pharmaceutical chemist could not, without serious prejudice to the responsibility of his trade, be at the same time a seller of sulphuric acid, muriatic acid, oxalic acid, sugar of lead and other such things. The sale of those and many other articles of the same class should be in the hands of those who had served their time to the business, and who had given a guarantee to the Society by the passing of a modified examination that they were properly qualified to sell them; and it should not be allowed to pass into the hands of oil and colourmen, drysalters and hardware merchants, as it would, if the chemists and druggists should become extinct, as the Council seemed in past times to have wished. To sell small quantities of laudanum, etc., did not require a very large amount of knowledge of materia medica and pharmacy, but only a good stock of practical common sense—a quality the chemists and druggists had proved themselves not deficient in, considering the few mistakes that they had made during the last twelve years. By not taking full advantage of the powers granted to them by the Act, the Council had inflicted great injustice on the assistants and apprentices who were in business at the passing of the Act; and it was also unjust to demand that those who had served their time since should in addition serve two or four years with a pharmaceutical chemist, and pass an examination much severer than the Act intended. The preamble of the Pharmacy Act of 1875, said:—"And whereas a great deficiency exists throughout Ireland of establishments and shops for the sale of medicines and compounding of prescriptions, and great inconvenience thereby arises to the public in many parts of the country; and whereas to remedy such inconvenience it is expedient to amend the Act of 1791, and to enable persons, who, although they do not desire to practise the art and mystery of an apothecary, desire and are qualified to open shop for the retailing, dispensing and compounding of poisons and medical prescriptions, to keep open shop for the purposes aforesaid." The Council had not supplied pharmacists to Ireland. Why? Because by their bye-laws they had shut the door upon the most likely source from whence a plentiful supply of candidates was likely to have been obtained. If it were not for those chemists and druggists whom they had been prosecuting and endeavouring to drive out of business a very large proportion of the people of Ireland would be to-day totally destitute of the means of obtaining necessary medicines. The chemists and druggists had proved themselves to be a public necessity. They met a public demand and they enjoyed to a very large extent the confidence of the public. They therefore asked to be recognized and legalized. By so doing the Council would enlarge their own constituency, increase the stability and means of usefulness of their Society, and obtain the support of a numerous and important party, who, he feared, were at present alienated from them. By the report of the proceedings of the last meeting of the Council he saw that the President hinted that in the promotion of their intended Bill the Council would be likely to encounter opposing interests. The deputation, however, were willing to meet them more than half way. He thanked them for having listened to him, and had only to add that he was authorized to mention that Sir James Hazlett's services would be at their disposal in furtherance of the objects of the deputation.

Mr. Shaw said he could only endorse the remarks of those who had spoken before him. In the *Chemist and Druggist* of last week there appeared a letter from a Belfast chemist. The chemists and druggists who were in business in Belfast at present, and who had entered into business since 1875, had every one of them served their time legitimately to the business.

Mr. Rankin was understood to say that there might be other men in business there, but the deputation did not represent them.

The President: Well, gentlemen, we are very much obliged to you for stating your views so plainly; and while you are here I shall give you a short *résumé* of the way in which this question stands, and will, I think, be able to remove one or two misconceptions under which you labour. This matter is not at all new to the Council. The very moment it was started on its work it saw that there was a great defect in the Act, namely, that it had no power to register those persons who have been engaged in the sale of poisons since 1875. Ever since it has been trying—the Act of 1875 having been a Government Bill—to get the Government to bring in a Bill to amend it, and to give them those powers. Early in 1884 the matter was brought to a point, and the views of the Council were thoroughly threshed out, printed, and forwarded to Mr. Trevelyan, who was then Chief Secretary for Ireland. We had an interview with him, and he gave us every reason to hope that a Bill would be introduced by the Government during that session, and the matter settled; but nothing has been done since. Last year we hoped that Sir Michael Hicks Beach, who is the father of this Bill, could be induced to do something for us; but he declined to do so, and we are now thrown upon the necessity of appealing to some private member of Parliament to do something for us. We communicated with Lord Miltown, who introduced the Pharmacy Acts Amendment Bill in the House of Lords last year, and he has kindly promised to do what he can for us. The question as to the establishment of another grade—a grade of registered chemists and druggists, who shall

be entitled to sell poisons, but not to compound prescriptions, is one that has been before us for years and years. The Council are not unanimous upon it; but a majority of them are opposed to it, being of opinion that no grounds have been shown for the perpetuation of such a grade. What the Council proposed in the Bill which it wished the Government to bring in in 1884 was, that in consequence of the great difficulty of tracing who were and who were not engaged in the sale of poisons at the time of the passing of the Act of 1875, the principle of the preservation of the rights of all such persons should be extended to the year 1884; and in any Bill that is to be introduced now, its idea is to include all persons who are at present engaged in the sale of poisons and are *bonâ fide* chemists and druggists up to the present date, and to have power to register them as such; but as to the establishment of another grade to be admitted by a separate examination, the Council is opposed to that. The matter was only dealt with by the Council with a view to the interests of the public, because they were of opinion that prospective individual interests had ceased to exist on the passing of the Act of 1875. That Act became law because the Legislature felt that a state of things existed which should not be allowed to continue. That state of things was accordingly put a stop to; but in order to prevent undue hardship from the sudden stoppage of business and to enable those who wished to do so to qualify, a year of grace was given, during which those engaged in business could qualify under a very modified examination. The second of the resolutions, read by one of the deputation, states that the traders are under the impression that the Act of 1875 contemplated the establishment of a second grade, whereby on their passing a minor examination dealers in drugs and poisons could be legalized. The Irish Pharmacy Act was on the lines of the English Act. The English Act qualifies two grades—the pharmaceutical chemist and the chemist and druggist. These are equal in rights as regards the public; both are equally entitled to dispense medicines. If those grades had been adopted in Ireland, both of these grades would under the Act have had exactly similar rights as to dealing with the public. Mr. Gibson read a portion of the preamble of our Act of 1875, but I do not think he grasped the exact meaning of that preamble. That Act was passed, not to provide dealers in medicines or poisons, but to provide persons who should dispense medicines, it being felt at the time that the supply of apothecaries through the country was not sufficient to meet the demand. The preamble says—"And whereas to remedy such inconvenience it is expedient to amend the Act of 1791." That was the Apothecaries Act, which did not affect in any way the general trade of the chemists and druggists in the sale of poisons. The sale of poisons previous to the Pharmacy Act was open to anyone in the country; but no one could engage in the dispensing of prescriptions except apothecaries. In that respect Ireland differed very much from England, because until the Pharmacy Act of England was passed anyone could dispense prescriptions in that country. But our Act of 1875 enables persons who, "although they do not desire to practice the art and mystery of an apothecary," that is, to act as visiting physicians and dispense medicines, "desire and are qualified to open shop for the retailing, dispensing and compounding of poisons and medical prescriptions, to keep open shop for the purposes aforesaid;" and the preamble says that "for the purposes aforesaid it is expedient that provisions, such as are in this Act contained, should be made for the formation of a Pharmaceutical Society in Ireland, and for the examination of persons desiring to keep open shop for the purposes aforesaid, and for the registration of such of the said persons as may be found, on examination, to possess a competent practical knowledge of pharmaceutical and general chemistry, and other branches of useful knowledge, as fit persons to keep open shop for the dispensing and compounding of prescriptions of duly qualified medical practitioners," so that the Act never contemplated anything but the supply to the country of dispensers of medical prescriptions.

Mr. Rankin made an observation, which was not heard.

The President: I wish to make it clear that under our present Act we have no power whatever to deal with such a grade as you speak of, so that any arrangement of the kind must be the result of legislation on new lines. There is one point on which I would say something, namely, with regard to the vested rights of those who were apprenticed to the trade at the time of the passing of the Act. In these days when legislation comes so rapidly, and when such enormous changes are made, it is not an uncommon thing for the prospective rights of aspiring members of professions, and even of the inheritors of property to be interfered with; and it is impossible that every prospective interest in a state of things, which has been put an end to by legislation, can be compensated fully. We think that the Council sufficiently provided for any sudden cessation of rights of that sort by the year of grace and the very trifling examination by which men could qualify for the pharmaceutical license. I am now representing matters to you as they stand at present. The Council, of course, will very carefully consider the views that have been put before them. We are about to have an Act drafted for the purpose of being introduced in Parliament, and, of course, will consider very carefully the views you have put before us; and if we want any further information I am sure that you will give us any help or information that we may require in the preparation of this Bill. The "Suggestions of Amendments," which I now hand you, represent the present views of the Council as to what future legislation should be; but that statement was settled in 1884, and the matter has not been discussed since.

Mr. Rankin said what the deputation asked for was a legislation of the position of men who had gone into business since 1875.

The President: Supposing that legislation were to take place now, which would entitle those who came into business since 1875 to be registered, would that satisfy your body?

Mr. Rankin: That would satisfy our body.

The President: In that the Council is at one with you, for we are satisfied that it would be impossible to go back twelve years in fixing the date. We are of opinion that we should register, say up to the first day of next year, all who had entered into business up to that date.

Mr. Shaw: Entitling them to sell poisons, but not to fill prescriptions.

The President: Yes. Kindly put before your body the question as to whether they would be satisfied with the registration of those at present engaged in trade without going into the question of perpetuating that grade for the future by examination.

Mr. Rankin referred to the provisions of the English Act.

The President: In England the trade was much freer than in Ireland before the passing of their Act, as there was no monopoly such as existed under the Act of 1791. The "suggestions" to which the Council agreed in 1884 say, "It is recommended, therefore, that the Pharmaceutical Society of Ireland shall be given powers to require all *bonâ fide* chemists and druggists who shall have been in business on their own account on or before the first day of January, 1884 (for which read 1888), and who shall desire to continue that business, to make application, on or before a date to be named, to the Council of said Society to have their names registered; such application to be accompanied by a statutory declaration to the effect that they have been so engaged in business as *bonâ fide* chemists and druggists on their own account

prior to the said 1st January, 1884 (1888), and also by declarations to the same purport made by two duly qualified medical practitioners resident within ten miles of the place of business of the applicant. Such persons to pay on registration a fee not exceeding three guineas, and to be styled 'registered druggists.'" The Council specially wishes the adoption of some such title as "registered druggist," in order to put an end to the ambiguity which at present exists from the use of the term "chemists and druggists;" for, legally speaking, except those who were acting as *bonâ fide* chemists and druggists at the time of the passing of the Act there are no such persons at the present moment as "chemists and druggist" in Ireland.

Dr. Collins: I think the deputation wish to have some provision under which gentlemen who have not opened in business for themselves, but who have continued to be assistants to chemists and druggists, would be admitted to a legal position.

The President: I suggest that the members of the deputation should take these suggestions home with them and discuss them at the next meeting of their body; and any suggestions that they forward to us we will be very happy to consider.

Mr. Hodgson said he had received a letter from Sir James Hazlett, stating his inability to attend, and laying down two propositions. One was that apprentices and assistants should be considered. The President had stated what the desire of the Council was as to that—that those who should be in business at the time of the passing of a revised Act would be entitled to registration. The letter also referred to the establishment of a second grade. Their worthy President, for whom he (Mr. Hodgson) had a great regard, had stated that a large majority of the Council were completely opposed to that.

The President: I did not say a large majority. I said a majority.

Mr. Hodgson: I wish to say that it is not the unanimous opinion of the Council.

The President: I think we had better not go into that. I am here as the mouthpiece of the Council, and I have stated that a majority have a certain opinion; but I do not think we ought to enter into particulars.

Mr. Hodgson: But I think the minority are entitled to a voice.

Mr. Wells: If Mr. Hodgson goes on with this, I think it will be open to any other member of the Council to argue the matter too; but I do not think it would be a wise thing to do so at present.

The President: I do not think it would be wise to enter into controversial matters before these gentlemen. [To the deputation] I think a stretch of twelve years ought to enable you to meet us.

Mr. Clothworthy: We do not wish to be antagonistic in any way. We will report to our body.

The President: And any suggestions that you forward to us we will be happy to consider at our next monthly meeting.

Mr. Rankin suggested that prosecutions should be suspended pending legislation.

The President: That is a reasonable suggestion.

Mr. Rankin thanked the Council for the attentive hearing they had given to the deputation, saying he was sure they would do the best they could for them.

The deputation then withdrew.

Mr. Minchin asked did the statement that all persons who had gone into business between the passing of the last Act and the new one mean grocers.

The President: No, certainly not; only *bonâ fide* chemists and druggists who shall give satisfactory evidence that they are such.

A letter was received from the Secretary of the Technological Museum of Sydney, N. S. Wales, acknowledging the receipt of the Society's Calendar for 1887.

A letter was received from the Privy Council, enclosing a copy of a memorial from Mr. R. J. Downes, submitting that the Treasurer and Registrar should have been elected by the Council, and not at the general meeting, and that a point of order which he had raised against the election of Treasurer had been ruled against him; and also criticizing the arrangement of the Society's examinations.

The President said the matter had been before the Law Committee, who had recommended a reply to the effect that the Treasurer, as an honorary officer, was elected by the general body of the Society under the Bye-laws, and that no objection was made at the general meeting to the re-election of Mr. Ferrall on that occasion; and that the present system of examinations had been duly sanctioned by the Privy Council.

On the motion of Dr. Collins, seconded by Mr. Allen, the reply was unanimously approved of.

The President said that in reply to a letter of his he had received one from the Earl of Miltown, saying:—"I shall be very happy to be of use to the Pharmaceutical Society of Iraland in the way you indicate. I, last year, carried through the Lords a Pharmacy Acts Amendment Bill for the British Society. I think it failed to pass the Commons through obstruction. If so, perhaps it will be re-introduced next session with the necessary clauses relating to Ireland for the Amendment of the Act of 1875." On receiving that letter he (the President) wrote to Mr. Carteighe, the President of the Pharmaceutical Society of Great Britain, asking for some information from him, and expressing the opinion that it would be very unadvisable to get clauses for the amendment of the pharmacy law in Ireland inserted into the English Bill. He had received a reply from Mr. Carteighe concurring in that opinion. It was now necessary for the Council to get a Bill drafted in parliamentary shape for the purpose of being placed in the hands of Lord Miltown. The Law Committee had had the matter before them, and their report contained the following recommendation:—"The Committee recommend that the suggested amendments of the Pharmacy Act (Ireland), 1875, be drafted in the form of a Bill." It would be advisable to put the matter in the hands of some solicitor experienced in parliamentary work.

Mr. Hayes: Would you undertake it without some guarantee from the members of the Society? We could not in our present financial condition undertake a thing that will cost us £200 or £300.

The President: It is a matter of life and death to the Society, and it must be done.

Mr. Hodgson: Before we do it, should we not come to a unanimous decision as to what the Bill is to be?

The President: The suggestions have been in print since 1884.

Mr. Hodgson said they did not embody what he thought was desirable, and he thought it would be well to have the matter threshed out again in order to see what was the tone of the Council on the subject now. He held that there should be a second grade. There were a great many towns and villages in Ireland where no prescriptions were compounded, or ever would be, but where coarse articles and poisons were required; and that trade should not be in the hands of persons who were ignorant even of the appearance of common medicines, many of which were active poisons.

Mr. Hayes also thought that before going to any expense they should have the matter discussed again. Gentlemen who voted one, nay, three years ago, might have changed their minds since. Eminent politicians had changed their minds since then.

The President said no one felt more strongly than he did the necessity for a second grade, but he believed the majority of the Council thought otherwise, and that there was use in opening the matter again.

Mr. Hayes: I do not agree with you at all. I think a decision should be taken now, and we should have the way in which the members vote taken down in black and white.

Mr. Wells said he asked that that should be done the last time the subject was discussed, but it was not. He was still of opinion that there should be but one grade. Professor Tichborne had said that there were 1500 post towns in Ireland.

Mr. Allen: There are 1960.

Mr. Wells said that some of those towns had less than one hundred people in them, and had not even a house to hold a post office.

Mr Hayes moved—

"That a special meeting of the Council be held to discuss the subject again."

Mr. Hodgson seconded the motion, which was put and negatived by 6 votes to 5.

The President: Are you going to let your Pharmacy Amendment Act drop? It is absolutely necessary that we should be in a position to put something into the hands of Lord Miltown before Christmas.

Mr. Hodgson protested against a Bill being framed without all the members of the Council having another opportunity of expressing their opinions on it.

The President pointed out that the report of the Law Committee contained a recommendation which could be acted on.

Mr. Beggs moved—

"That that report be adopted; and that Mr. Robert K. Clay be employed to draft a Bill."

Mr. McCormack seconded the motion, which was agreed to *nem. con.*

The Council then adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourteenth general meeting of the thirty-eighth session was held at the Royal Institution, Colquitt Street, on Thursday evening, October 27. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—To the Library: *Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the Publisher; *Pharmaceutical Record of New York*, from the Publisher; *British and Colonial Druggist*, from the Publisher; and 'Ephemeris,' from Dr. Squibb, Brooklyn. To the Museum: sample of ginseng root, from Mr. A. W. Gerrard, London, per Dr. Symes, and sample of saccharin, from Dr. Symes.

A vote of thanks having been unanimously accorded to the respective donors, Mr. Charles Bromley and Mr. John James, were elected.

Dr. Symes exhibited a sample of soluble saccharin, which he said was a definite compound of saccharin and sodium, and contained 90 per cent. of saccharin, and he suggested that a 10 per cent. solution of this in water would be a useful strength to be employed in dispensing.

There being no further miscellaneous communications, the President called upon Mr. E. Davies, F.C.S., F.I.C., to read his paper on —

Fluosilicate of Sodium as a Disinfectant.

BY E. DAVIES, F.C.S., F.I.C.

The element, silicon, is in the mineral kingdom what carbon is in the organic. Being a tetrad and being able to join itself to other atoms of silicon, it can form compounds of great complexity; its oxide, silica, one of the most abundant minerals, is the anhydride of two acids, ortho- and metasilicic acids. Neither of these acids can be obtained pure, owing to the readiness with which each loses water, but the metasilicic is the more definite of the two. Its formula is H_2SiO_3, and if for the dyad, oxygen, we substitute the monad, fluorine, we get fluosilicic acid, H_2SiF_6.

This acid may be obtained by heating together silica, fluorspar and sulphuric acid, and passing the tetrafluoride of silicon into water, when we get both fluosilicic and metasilicic acids. $3SiF_4 + 3H_2O = H_2SiO_3 + 2H_2SiF_6$. If the fluosilicic acid is then neutralized with sodium carbonate, if the acid is strong, most of the fluosilicate of sodium separates in minute crystals, which may be filtered off and dried.

Sodium fluosilicate is only slightly soluble in water, 1 part dissolving in 150 parts of water. The solution has a saline, not unpleasant taste; it is powerfully antiseptic and disinfectant. Meat immersed in a saturated solution of it remained perfectly sweet after four days at a temperature of 25° C., whilst similar meat in distilled water was disgustingly putrescent and swarmed with bacteria; no living organism was visible in the fluosilicate. Urine was also preserved for a similar time by the addition of one-fourth of its bulk of the solution.

As a disinfectant, its effect was shown by the addition of one-fourth of the bulk of the water from the putrescent meat above mentioned, from which it removed all unpleasant odour and destroyed the living organisms. It is stated to be innocuous to health, and it is therefore a valuable addition to the list of antiseptics and disinfectants.

Mr. W. Thomson, of the Royal Institution Laboratory, Manchester, is the discoverer of the properties of this substance, and has patented it under the name of salufer.

In the discussion that followed, Mr. Conroy proposed a vote of thanks to Mr. Davies for his paper; this was seconded by Mr. Ward, supported by Mr. B. Dickens and Dr. Symes, and was heartily accorded by the meeting.

Mr. Davies having acknowledged the vote of thanks and replied to the discussion, the meeting terminated.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The first meeting of the Midland Counties Association for the present Session was held on Thursday evening, the 3rd inst., at the Grand Hotel, Birmingham. The chair was taken by the President, Mr. G. E. Perry, who proceeded to deliver the following—

Inaugural Address.

I am very sensible of the honour you have conferred upon me by electing me as President for the ensuing year of this Midland Counties Chemists' Association. And I am equally sensible of my incapacity worthily to fill so important and responsible a position. The task is made all the more difficult by my having to take up the mantle of one who by experience and ability was so peculiarly fitted for the work. Mr. Barclay—if he will excuse what may perhaps seem to him the language of flattery—was an ideal president. His extensive knowledge of matters pharmaceutical—the outcome, it should never be forgotten, of much labour in the cause of pharmacy—and his equally familiar acquaintance with the duties and requirements of a public position, to say nothing of his inaugural qualities, have enabled him for the last three sessions to occupy this chair with a distinction which perhaps no other member of this Association is capable of achieving. You cannot expect, you will not, I am sure, expect to find in me a second Mr. Barclay. I can only say that to the best of my ability I will do what I can, during my term of office, to further in every way the interests of this Association.

Now, gentlemen, we often hear it said—and at the time when subscriptions are due, and more particularly when they are applied for, the remark is apt to be common—"What is the *good* of the Association?" Such a question might be addressed, and applies with equal force not only to our own, but to any and every association of like character and similar aims. But surely it ought not to be necessary in this the very hey-day of associations, to have to give a *raison d'être* for our exist-

ence. At no time perhaps in the history of pharmacy has the necessity for a closer union been more forced upon us than at the present moment. We are attacked both from within and from without. There are those in our own ranks who, animated either by an eagerness to grow rich at the expense of others, or, as is probably more generally the case, by what they conceive to be a necessity of the times in which we live, whatever the motive, seem nevertheless to be doing their utmost to degrade pharmacy to the level of an ordinary trade, and are reducing profits to so low a point that before long, if such a state of things continue, it will be next to impossible for a pharmacist to eke out even a bare existence by the legitimate practice of his calling. And from without we are assailed by a host of others, who by an infraction, if not of the actual letter, as *we* contend, at any rate, of the original intention of the framers of the Pharmacy Act, are enabled, let us hope only temporarily, to usurp our position, and to defraud us of what in the past we have so zealously laboured for, and to what, by every canon of right and wrong, we are honestly and legitimately entitled. Is there no reason here, is there not indeed an actual necessity here, for the existence of such an Association as this ?

We, then, as an Association, exist—shall I say primarily ?—for self-defence. This was all but unnecessary in times gone by—in the halcyon days of pharmacy—when any pharmacist, worthy of the name, could look for and count upon the appreciation and support of a grateful public. But we have, unfortunately, to face a different condition of things now ; and it is in Associations like this that we can best consider and discuss our position. It is here, if anywhere, that as far as local effort can avail, we can devise means for our amelioration ; it is here that we can strengthen the hands of the Pharmaceutical Council in any action they may think desirable and politic to take for the general welfare of pharmacy.

We exist, too, for intellectual advancement. Original contributions are invited and read before us, and the discussions to which these give rise cannot fail to have an elevating influence on the minds of those who, for the time being, give themselves up to the "feast of reason and flow of soul." In such a delight, the man whose only ambition in life is to get money has no part. To him, and rightly, too, are denied the pleasures which flow from a participation in such ennobling pursuits. We exist, then, not simply for self-protection, but for intellectual culture and advancement.

And then, too, we have the social side of our organization. This, as far as we locally are concerned, is in no danger of being in the least neglected, so long as we have our present worthy Secretaries at the helm. They will take care that the musical evenings and the annual ball come off with that *éclat* to which we are so well accustomed.

Now, it is a lamentable fact that pharmacists in the past, and to a large extent still, have been and are sadly lacking in what by reason of their education they know more about than they seem capable of displaying, viz., the property of *cohesion*. We have had additional evidence, if such were needed, of this absence of cohesion amongst us, in the recent collapse through want of funds of one of the strongest bulwarks of our commercial position, I mean the Chemists and Druggists' Trade Association. This Association, founded at a time when our calling was in danger, when more than one over-zealous public analyst seemed to be thinking that the path to glory and renown lay in the direction of a "case" against some unlucky pharmacist,—this Association, by its courage and determination, and supported as it then was by the ready contributions of its only too-willing members, soon began to put a different complexion upon things, and succeeded ultimately, after many a hard-fought battle, in establishing a feeling of security in our ranks. And because, forsooth, this Association could not go on continuously fighting, for the simple and sufficient reason that its foes for the time being were non-existent, it was ungenerously, and as, I think, most unwisely, allowed to languish and die.

More to be regretted still, as it appears to me, is the action taken by many in withholding, and indeed in withdrawing support from the parent Association—the *alma mater* of pharmacy—the Pharmaceutical Society of Great Britain. Surely if any association deserved the ungrudging and generous support of its members, the Pharmaceutical Society, by its brilliant record of the past, has pre-eminent claims upon us as pharmacists. Indeed, it ought only to be necessary for us to picture to ourselves the condition of pharmacy as it might have been now, and undoubtedly would have been, if we had had no Pharmaceutical Society, to set at rest the cavillings, and expose the utter folly of those who would be done with the Pharmaceutical Society, and would substitute they know not what in its place. I do not hold a brief for the Pharmaceutical Society. I am not saying that everything it has done, every action it has taken, has been well-timed and not open to question, but this I do say, that if it had not been for such men as Jacob Bell, Thomas Morson, Henry Deane and others, the founders and supporters of this Society, the position of pharmacy would have been very different to what it may fairly lay claim to at the present day.

And then it should always be remembered that the Pharmaceutical Society is not an oligarchy ; it is a purely representative body ; and if at any time we are not satisfied with the work it is doing, the remedy is in our own hands. We can reconstitute, we can reorganize this Pharmaceutical House of Commons, and send men to its Council pledged to carry into effect, to the best of their ability, the wants of their constituents. But this is impossible so long as the large majority of pharmacists persist in holding aloof from the Society, and are content to lie fallow in the cause of pharmacy.

It is hardly credible, but it is nevertheless the fact, that out of something like 14,000 qualified men on the register, there are but about one-third—34 per cent. I believe the actual number—who subscribe to, *i.e.*, who are members and associates of the Society, and who by virtue of their membership are enabled to take an active part in its organization and work. This condition of things, in my opinion, is nothing short of a disgrace to pharmacy. It is clearly the duty of every pharmacist, whether he approves of the past work of the Society or not—it is clearly his duty at the present juncture for the welfare of pharmacy—and never was the call more urgent—to become a member of the Society, and to support it by every means at his command. Surely the small sum of something less than 6*d.* per week, and less than 3*d.* in the case of an associate, cannot be too high a price to pay for the privileges such a membership confers !

Pharmacy has unquestionably fallen on evil times. The Act of 1868, which imposed on all, or was intended to impose on all, a personal qualification is being openly set at naught and made of non-effect by a procedure which, according to the judgment of our highest courts, places the individuals who take advantage of it outside the scope and provisions of that Act. I allude of course to the so-called limited liability companies. In fact, with the wholesale manufacture of these companies which is going on at the present day for the very purpose, as far as we are concerned, of filching from the legitimate pharmacist the due reward for his services to the community, pharmacy, in such quarters, is fast drifting once more into the unsatisfactory condition it was in before the passing of that useful and salutary measure. "It cannot be supposed," said the late Lord Chief Justice Cockburn—and they are the words of perhaps the greatest legal mind of his day—"it cannot be supposed that the Legislature can have contemplated a result so entirely at variance with the policy and purpose of the

Act, or intended to place incorporated companies on a different footing in this respect from that of ordinary partnerships or individuals."

The law intended—it is a common-sense interpretation of the statute—the law intended that the business of a pharmacist should be carried on only by a qualified person, that this qualification should be demanded of the master, and not necessarily from the servant, and that although an unqualified person might have in his employ a qualified servant, this should not relieve the master of the necessity of qualification, and could not be deemed a sufficient guarantee for the safety of the public. But, by reason of the unfair and, in our opinion, radically wrong construction put upon the statute, what was *not* intended has in this way actually come about, to the injustice and injury of the legitimate pharmacist, and, what is more serious still, to the public detriment.

It may, however, be said, and *is* said, "Let the public take care of themselves." But, as Professor Attfield says, "*caveat emptor* does not apply in the case of drugs, because the purchaser has not the requisite knowledge to enable him to *beware*. Even the aid which purchasers of *food* can invoke from officials under the Act relating to adulteration cannot be obtained in the case of drugs, because amongst other reasons Nature yields drugs which vary much in quality, and only trained chemists and druggists can properly judge of such quality." And then he goes on to state, that "as regards the retail dealer it is evident," from the interpretation put upon the Pharmacy Act, "that the machinery for the protection of the public under this Act is incomplete."

Another cause of dissatisfaction and discouragement to pharmacists—and a justifiable cause—is the continued persistence of a great number of medical men to dispense medicines. It was thought that in due course of time, after the passing of the Act of 1868, when a thoroughly competent body of dispensers should become available, that the custom of dispensing by medical men would gradually cease, and that compensation to the pharmacist for the labour and pecuniary sacrifice demanded of him would be found in the gradual transfer of this work to his hands. This desirable change unfortunately has not taken place to the extent that was hoped or anticipated; and there is no question that this exercises a depressing effect upon many, and justifies, to some extent, the doubts which are from time to time given expression to as to the good of our increased scientific education. There are naturally some difficulties in the way, but, at any rate, in large centres like Birmingham, and in smaller places, if not in all, save outlying districts, the necessity for dispensing by medical men at the present time no longer exists. And it is certain that if the whole or the greater part of the dispensing that is now done by medical men could, in some way or other, be transferred to the pharmacist—the man best qualified for the work, and who is morally entitled to it—such a change would be for the interests of medicine, of pharmacy, and of the public alike.

This is the view that is taken by the leading men in the medical profession. Sir Dyce Duckworth, Treasurer of the College of Physicians, said in reference to this matter the other day, "I had hoped that this system—the dispensing of medicines by my own profession—was likely to come to an end, and believed that the necessity for it was hardly any longer existent. Other views have, however, prevailed. I hold the opinion that the necessity for this practice is now very small indeed anywhere in the towns, and not so pressing as is believed in country practice. There can certainly be no doubt that with the increasing numbers of highly qualified pharmacists that issue from the schools of London and Edinburgh the necessity becomes anually and everywhere much lessened." "I affirm," he says, "without hesitation, the fact that your diplomates, as a rule, are better fitted to act as public dispensers than members of my own profession, and I can, therefore, only express the hope that you may *steadily wrest* this sphere of work from men who have already too much else to do and think about, and who are less well qualified to do it." Now these are words which "those who run may read." Certain it is, that until we have a forward movement in the direction which Sir Dyce Duckworth here advocates, we cannot look forward to a very prosperous future for pharmacy.

I wish, gentlemen, that it had been possible for me on this occasion to have recommended a *specific* for the present depression in pharmacy. While, however, the evils from which we undoubtedly are suffering may be readily enough discerned, it is by no means so easy to discover a remedy. But whatever else may prove effectual in bringing about a better condition of things, this much is certain, that it will not be found in abuse of the Pharmaceutical Society. The Pharmaceutical Society, as has been well said, has the *charge* of pharmacy. It exists for the good, for the sole benefit of pharmacy and the pharmacist. And further, if in the future any legislation is to be obtained that shall be of value to the pharmacist, it can only only be obtained by the Pharmaceutical Society acting on behalf of the whole body. How necessary, how imperative it is, then, that we should endeavour in every way to strengthen the hands of this Society. I would, as a pharmacist, having the interests of pharmacy very much at heart, call upon every pharmacist who is not at present enrolled under the banner of the Society to reconsider his position. I would ask him to join hands with us members of the Society—who are as fully alive to the condition of things as he is—in our endeavour to make the Pharmaceutical Society a powerful organization—not, as in the past, to be weakened by indifference, nor impeded by opposition in the good work, which it has always been its desire and aim to accomplish. I would, too, impress upon our younger members the necessity of taking an early and an active interest in the work of the Society, for by so doing they will be contributing in no small measure to its power for usefulness, and will themselves reap as our successors the benefits which in their earlier days they had been instrumental in obtaining.

Well, I say the remedy will not be found in unmerited abuse of the Pharmaceutical Society.

It is thought by some that an amendment of the Pharmacy Act in the direction of preventing all but the qualified pharmacist—corporate bodies as well as individuals—from keeping open shop for the selling and dispensing of poisons, would, as far as legislation was concerned, meet the necessities of the case; and it is urged that an attempt should be made to obtain such amendment. The Act, as it at present stands, would appear to an ordinary mortal to be comprehensive enough for the purpose; but as I have already said, by a legal quibble an exemption has been made in the case of corporate bodies, and they at the present moment are actually outside the law as regards this particular Act. It is to make it penal for seven or more persons to do what one or two are forbidden to do that it is advised that an effort be made to obtain an extension of the Act on these lines. No one who has given any attention at all to the matter can for a moment deny the justice and reasonableness of such a request. Professor Attfield, in the admirable address from which I have already quoted, makes the following pertinent remarks on this very point. He says, "The labourer for the good of all is at least worthy of reasonable reward when working at his calling. The pharmacist will continue his researches for the benefit of his fellow men. When, however, in Great Britain the State says to him, 'It is necessary that you who deal in drugs should for the welfare of the community be properly trained as an apprentice, be educated, be examined and be registered;' and then when the druggist has willingly complied with the demand, the State permits untrained, uneducated, unexamined and unregistered men to deal in drugs, the trained, educated, examined and registered man rightly feels aggrieved, and

turns to the State for redress. Let this always be remembered, however, that not only for himself does he seek the remedy. He reminds the State that it was for the protection of the public health that he was required to be educated, examined and registered, and that it is in the interests of the public far more even than in his own interests, that he asks that this protection be saved from being a *sham*, as well as that it be saved from being a mere handicapping arrangement, preventing him from making his way in the race for livelihood." These words were spoken more than four years ago, but the State does not seem as yet to have done anything to make amends for its shortcomings.

Dr. Greenhow, the Government visitor at our examinations, who is likely to be listened to in the event of further legislative action dealing with this anomaly, holds also similar views. He said the other day, "Speaking as in individual, and not in an official capacity . . . . . I am strongly of the opinion that both in the interest of the public, and I may add in that of pharmacists, who are now compelled by law to obtain a certificate of competency before commencing business, it would only be right that no one who does not hold this certificate should be allowed to retail officinal medicines." "I would not," he further says, "prevent grocers and stores from selling such simple medicines as castor oil, salts and senna and the like, but I *would* restrict the right of selling every compound medicine ordered to be prepared after a certain manner in the Pharmacopæia to legally qualified pharmacists."

Whether, after such an expression of opinion from one holding so important a Government position, we are drawing nearer to the time when the State will recognize its duty towards us, and through us, to the public, I know not ; but at any rate, for my part, I have confidence in the Council of the Pharmaceutical Society that whether, in the Poisons Bill to be introduced by the Government, or when other opportunity offers, it will do its utmost to safeguard the interests of pharmacy, these interests being, as they are, identical with the public welfare and security.

But undoubtedly an upheaval of the old traditionary pharmacy is gradually taking place. Pharmacy in the future will be very different to the pharmacy of the past. Everything seems to point to a severance sooner or later, of what is more or less the professional side of pharmacy, from that which usage for so long has associated with it of a purely commercial character. In a word, it all points to a *personal*, rather than to a legal, qualification, for the status which a pharmacist ought to occupy in the general community.

And this leads me to speak of the means, the further means, which have been recently devised, whereby this personal fitness may be best assured.

The Pharmaceutical Council, as you are aware, have introduced into Parliament what is entitled a "Pharmacy Acts Amendment Bill," which, though shelved for the time, will, in all probability, if Ireland will but get out of the way, before long become law. This Bill is an attempt to secure the better training, the higher education of the pharmacist. By its provisions all who henceforth may seek to enter the portals of pharmacy must proceed in a prescribed manner. The pharmaceutical student will be required to attend certain courses of lectures, and have definite scientific and technical instruction, before he will be allowed, as now, to present himself for his qualifying examination. This, I am convinced, is a step in the right direction. We have seen, again and again, attempts made in various centres to provide a definite course of instruction for pharmaceutical students. The advantages offered by local classes formed for this purpose have been but to a limited extent utilized by those for whose benefit they were instituted and carried on. And this because attendance at such classes was purely voluntary on their part, and not required by the statute.

Hence it has happened that the majority of students have preferred—and with human nature so incurable as it is, will under the present system doubtless always prefer—to try and get the amount of knowledge they think just sufficient for their present needs, in as many months as, to be of lasting service, it should have taken years to acquire. The result has been much dissatisfaction, and much waste of time and money in repeated attempts to pass the examinations ; while the majority of those who *do* pass are not, I submit, quite up to the level of what should be expected or required from a pharmacist as a scientific man.

This state of things the Pharmaceutical Council by this Bill are doing their best to mend. Whether the scheme may come to us in the form proposed by the Pharmaceutical Council, or modified in some such way as suggested by Mr. Barclay in his address before this Association last year—is a matter of detail. What we want, and the sooner we have it the better, is the regular and continuous training to which I have referred—from the early days of pupilage, when the acquisition of knowledge has more or less become a habit, and when knowledge itself, by reason of the absence of care, is the more readily assimilated—right up to the time when the student shall be of age to submit himself for his final examination. I believe if this measure should pass into law, that it will be of the greatest benefit to pharmacy and pharmacists. It will insure a definite, a continued, and a more comprehensive training than, save by the few, has been hitherto obtainable ; while to students themselves the gain will be incalculable. They will know at the very outset of their career what they have to do, and how they are to do it ; the end will be achieved, the goal will be won, by a far less expenditure of time and money than is the result of the present wasteful and disastrous process.

A further step in the direction of securing a high personal qualification for the pharmacist has recently been taken by the Council, which, in my opinion, ought to commend itself to every well-wisher of pharmacy. I allude to the establishment of a laboratory for pharmaceutical research. I think it will be admitted that we are by no means so familiar with the chemistry and pharmacology of many of our drugs as we might be ; it is certain that *all* our preparations are not of that definiteness and constancy which they ought to possess. It is, therefore, to supply the need for extended knowledge in this particular sphere that it has been thought desirable to establish this research laboratory, where systematic work may be carried on, and where it is hoped and believed much of value to medicine and pharmacy may be accomplished.

We know there are many who decry these ideas of an extended scientific education. But, gentlemen, I myself can see but two paths open to us—the one of commercial competition, which for us, trammelled as we are, leads to little but comparative insecurity, while the other leads right on to a vantage-ground which none but those who tread that path will be able to gain. It is to this eminence that it will be wiser for us to direct our steps. The sure and certain law of the survival of the fittest, of those who in every sense are best equipped for their work in life, will most certainly not leave *us* out of count. I believe that in the future a better, a more secure position awaits the pharmacist ; but only in proportion as his personal qualifications shall entitle him to the respect and recognition of scientific men, and of the intelligent public, will that position be reached and maintained.

Now, gentlemen, I have done. I could have wished that the task had been in other and more competent hands, but as the duty of addressing you has been laid upon me, I have done my best to discharge it. I can only hope that the session upon which we have just entered may be a busy and a prosperous one ; it lies with you, gentlemen, each one of you, to help us to make

it so. We shall be glad of any papers and of any notes—however short—that may be of pharmaceutical interest; and we shall gladly welcome any suggestions that may contribute in any way to the welfare of this Association, and through it to the advancement of pharmacy.

At the conclusion of the Address a vote of thanks to Mr. Perry was proposed by Mr. Barclay, seconded by Mr. Arblaster, and after some discussion carried unanimously.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Incidence of the Medicine Duty.

Sir,—The time has surely arrived in the civilization of this country for a revision of the Medicine Duty Act. The Government stamp on medicine is grotesque, and matters are not mended by the recent addition, "This stamp implies no Government guarantee." What on earth would it be worth if it did! Moreover, the Government lays itself open to the very natural retort, "This stamp in no way detracts from the value of the medicine," although it would not be quite true. It is well known that all or nearly all dispensed and compounded medicines do not improve by age, and there can be no doubt that the stamp, especially on the more expensive, acts to some extent as a barrier against destruction and renovation. It is not only a dead, but also a vexatious loss to the owner to destroy or spoil the stamps. Again, it is curiously unequal, even in its own limited province, in its incidence. Why should Lamplough and Eno go free, and Beecham and Collis Browne be taxed.

It is a maxim "that no man can plead ignorance of the law." A short time ago I selected two labels for an opinion as to the liability of stamp duty. There was no secret about either remedy, and certainly no proprietary interest. One came back from Somerset House marked "liable," the other "not liable." The liable one could not be used, and had to be abandoned. It was practically impossible to use the stamp on account of the extremely volatile character of the remedy. The result is it now goes out without directions for use. I mentioned the fact to a very intelligent Inland Revenue officer, who, taking up a box of pills from the case, said: "Why, all these sort of things are really liable, but the law is not pressed."

I have said enough to show how difficult the Act is to interpret, and I hope it will draw the attention of the Government to the matter, for loyal citizens should not be harassed by ambiguous laws. Mysterious statutes produce judge-made law and confound the people.

We do not smoke, or even buy our cigars with a Government stamp on them, and yet a very large revenue is derived from tobacco, good, bad, indifferent and abominable.

If medicine is to pay a tax—and why not?—let it be a direct, intelligible and comprehensive one. Say a *pro rata* licence on medicine dealers and compounders, calculated on the assessment; an import and export duty on all medicines protected by a trade mark, or otherwise proprietary. And away with the little red flag.

George Mee.

Commercial Saccharin.

Sir,—I notice in the *Pharmaceutical Journal* for November 5, page 377, some notes on saccharin by Mr. W. A. H. Naylor, in which he particularly emphasizes certain marked differences between the results obtained by himself, and those published under my name in the same Journal for October 22, page 337.

Since the publication of my notes, I have had an opportunity of examining other samples of this compound, which, for purposes of comparison, I will call B and C.

The inorganic solids, left on complete combustion of these samples, differed beyond reasonable limits; being in the case of B 2·9, and C 6·6 per cent. respectively. The nature of the resulting residues also differed from that of the original, both having a distinct ferruginous appearance, which, on submitting to an examination for iron, gave unmistakable evidence of its presence.

With regard to the liberation of boracic acid from borax, I think Mr. Naylor must have come to a rather hasty conclusion that such is not the case. He apparently satisfies himself on this point by a simple application of saccharin to hot and cold aqueous solutions of borax respectively, without regard to the possibility of an excess being required. I think there is always the possibility of the formation of a double salt in the use of such a complex organic acid as saccharin; and I am aware that, although it possesses such decided acid properties, it may be added to a solution of borax in fair quantities before any sign of acidity is apparent in the mixture. I think if Mr. Naylor will only take care to add this acid until his solution of borax shows a distinctly acid reaction, he will have no difficulty in confirming my statement, that boracic acid is liberated.

In applying this test, I had before me the comparative solubility of saccharin in water and in alcohol, and, on account of its greater solubility in the latter, I elected to apply it as follows:—A blank test having ensured the absence of free boracic acid in the powdered borax used, a solution of saccharin in alcohol was applied to the powder, when ignition of the spirit gave very definite evidence of free boracic acid in the flame, a result also obtained with samples B and C, and which I think I am justified in attributing to the action of the saccharin.

The fusing point probably differs with the more or less complete decomposition of the saccharin, by the time occupied, and the more or less gradual application of the heat employed in taking the observation. A sublimate of something takes place at a little over 100° C., as stated by Mr. Naylor, and if this is a decomposition product, I am of opinion that the fusing points quoted may not represent saccharin at all, but some decomposition product or products resulting therefrom. It may also be pertinent to point out another possibility of difference in the earlier samples of saccharin. A second modification of this compound is produced in the manufacture of this article, both of which I believe were described as saccharin in the original specification, and that the delay in placing it upon the market was due to necessary alterations in this document and the manufacture, so as to make one only the representative article.

300, *High Holborn*. E. D. Gravill.

Solution of Saccharin.

Sir,—I beg leave to suggest the following formula for a solution of saccharin for sweetening medicine when it is undesirable to use sugar. The proportion of this product of toluene, which corresponds in sweetness to a fluid ounce of syrup, I find to be 1 grain.

Saccharin	1 grain.
Bicarbonate of soda	1 grain.
Distilled water	1 fluid drachm.

Mix.

J. B. Barnes.

E. R.—We believe not.

T. J.—Allotropic phosphorus is converted into the ordinary form by heating without access of air to a temperature of 260° C., but in your case we do not think it would be worth incurring the risk attending the experiment.

J. Bainbridge.—We hardly think it would be practicable, but try tungstate of soda.

Communications, Letters, etc., have been received from Messrs. Gwillim, Trowbridge, Anderson, Pharmacist, Apprentice, G. W., J. B.

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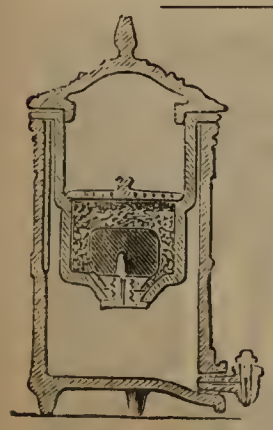

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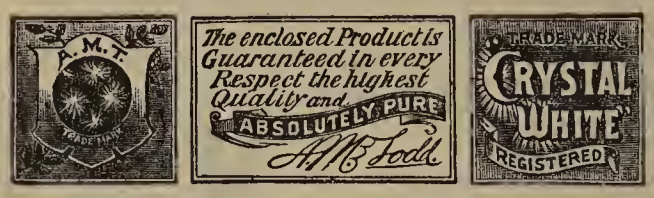

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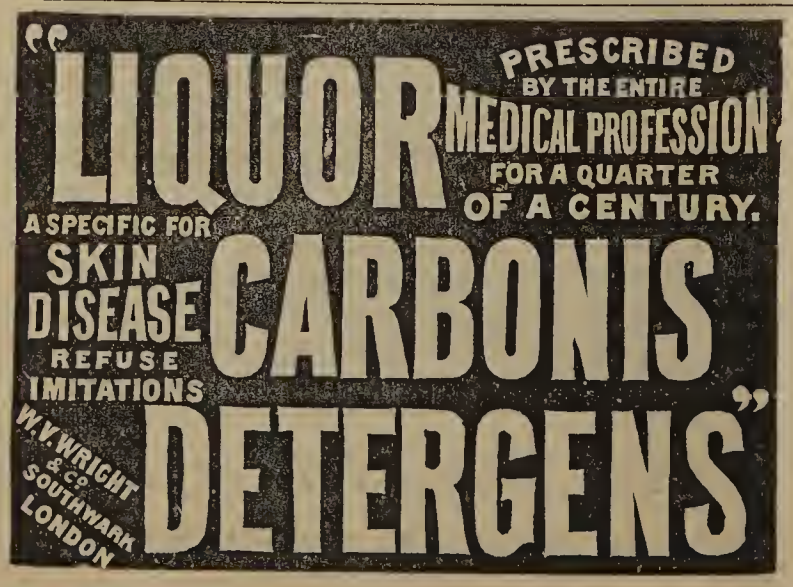

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,, R. Coley.
,, E. B. Dunn.
,, A. E. Fardon.
,, W. G. Gale.
,, A. P. Golden.
,, A. F. Heald.
,, G. H. Horne.
,, J. A. Jennings.
Mr. S. H. Hall.
,, A. J. Parish.
,, J. H. Parker.
,, D. Phillips.
,, A. E. Hickmott.
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Age- 3. S. Sec. 3 Vol. V

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 908.] SATURDAY, NOVEMBER 19, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.
RICHARD BREMRIDGE, Secretary and Registrar.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

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SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

PRELIMINARY EXAMINATION.

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

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For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 2nd day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 5th, 1887.

For list of approved Candidates see next page.

There are at present *forty-six* annuitants, receiving £1575 per annum, and casual relief is also granted amounting in 1886 to upwards of £630, involving a total annual expenditure of more than £2200.

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Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

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APPROVED CANDIDATES.

BAKER, SARAH E. Age 52. Finsbury Park, N. Widow of Frederick Bond Baker, of Dalston, a registered Chemist and Druggist in business before August 1st, 1868. Applicant has hitherto been earning a livelihood by dressmaking, but too close application to work has seriously affected her sight, and she is very deaf. Her only son, a detective officer, is married, has a family to support, and cannot render much assistance.

COLLINS, MARIA. Age 72. Sydenham. Widow of John Richard Collins, of Clapham, an Annuitant from 1885 to 1887, who was for forty-four years previously a Member of the Society. She has two sons (one a permanent invalid) and two daughters, neither of whom can render her much assistance. Applicant is in feeble health, and endeavours to earn a little by letting furnished apartments.

GOADSBY, ELIZABETH. Age 68. Salford. Widow of Francis Goadsby, of Manchester, a registered Chemist and Druggist in business before August 1st, 1868, who died in April, 1882. Applicant is quite unable from excessive weakness to do anything to earn her own living. *Fourth application.*

JONES, AUGUSTA. Age 59. Marlborough. Widow of Charles Jones, a registered Chemist and Druggist in business before August 1st, 1868. Husband was in business twenty-four years at Cowes and Marlborough, and died in 1878. Applicant continued to carry on the business until 1884, but was unsuccessful. The interest on £100 invested in gas shares is all she now has to depend upon, as she has no relatives able to help her, and her health is very feeble.

MCINTYRE, JESSIE. Age 72. Tweedmouth. Widow of Peter Slater McIntyre, of Tweedmouth, a Life Member from 1869 and a subscriber to the Benevolent Fund for sixteen years. Applicant's husband died in June, 1886, and the business was sold for the benefit of the creditors. She is quite without means, and her age and infirmities render her almost helpless.

POWNALL, LYDIA SARAH. Age 67. Lower Clapton. Widow of John Pownall, of Manchester, a Member of the Society from 1842 until his death in 1857. Applicant carried on her husband's business until 1872, when it was sold. She is in delicate health, and is at present living with a sister, who is also an invalid. Applicant makes a little marking ink, from the sale of which she realizes about £5 a year. *Third application.*

SOWTER, EMILY SARAH. Age 53. Tottenham. Widow of George Sowter, a registered Chemist and Druggist in business before August 1st, 1868. Husband was in business in London for about ten years, and at his death in 1881 applicant was left with six children. After his death a bill of sale for £35 was put in force, and her home sold up. She has to support four children. Applicant's eldest son, who lives with her, renders a little assistance, and she does a little needlework, but continued ill-health prevents her earning much in this way towards her maintenance. *Third application.*

SPENDELOW, MARY E. Age 57. Widow of Richard William Spendelow, of Liverpool, a registered Chemist and Druggist in business before August 1st, 1868. Husband was unsuccessful at the last two Elections of Annuitants, and died in January last, leaving his widow entirely without means.

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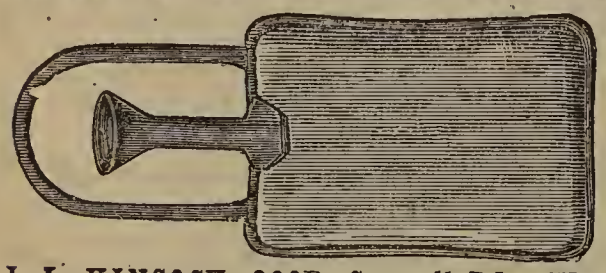

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For Terms for Advertisements see page iii.

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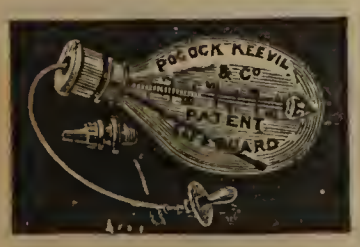

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	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
White Ordinary - -	1	4	1	5	1	6	1	8	2	0	2	4	2	10
With Screw Covers	1	10	1	11	2	0	2	2	2	6	3	0	3	6
Thin, for Dispensing	1	5	1	6	1	8	1	10	2	2	2	8	3	2
Thick, for Perfumery	1	4	1	5	1	6	1	8	2	0	2	4	3	2
White Ordinary, with Patent Keyhole notches for Elastic Bands, as shown below.	1	6	1	7	1	8	1	10	2	2	2	6	3	0

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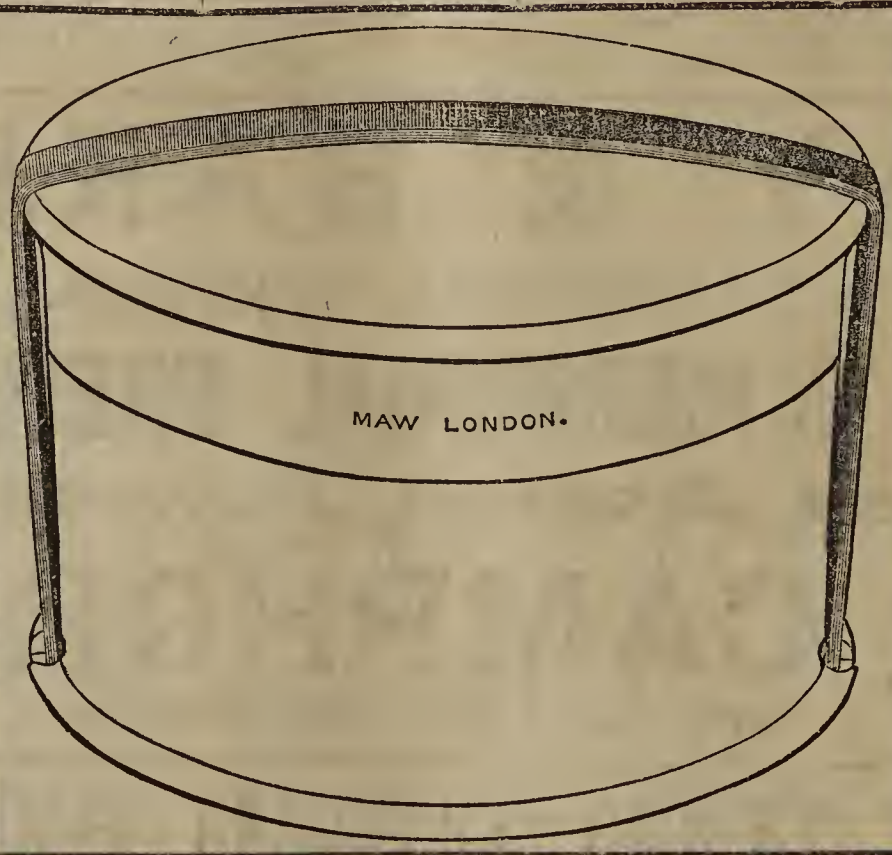
For 1½ oz. to 4 oz. 2/3 per gross.



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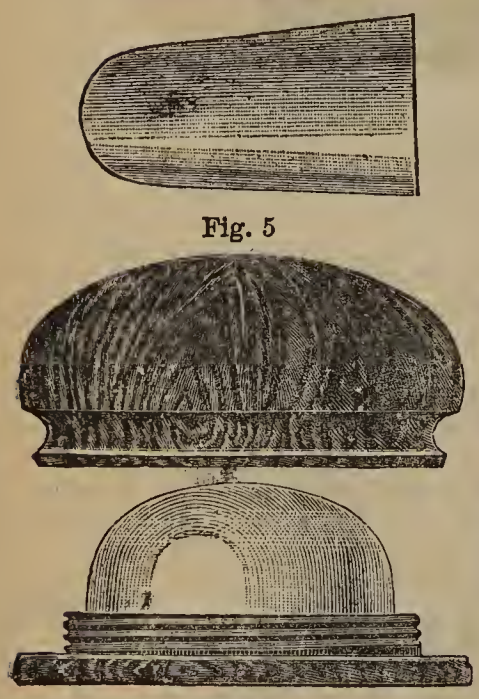

Fig. 1.

Fig. 3.

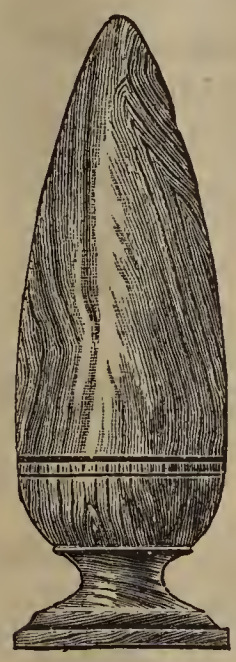

Fig. 4.

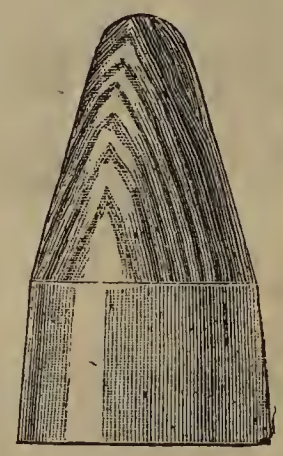

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 1.	In Ebony Cases, flat for the pocket	per doz.	**6/-**
	In Boxwood Cases, per doz., 3/- and 4/-; in Vegetable Ivory	,,	**6/-**
Fig. 3 & 4.	In Boxwood Cases, per doz., 2/8 and 4/-; in Vegetable Ivory	,,	**4/-** and **6/-**
Fig. 5.	In White Opaque Glass Jars, with Red Celluloid Caps	,,	**2/6** and **3/6**
	Mounted, in Stoppered Bottles	,,	**6/-**
Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps	,,	**4/6**
Fig. 7.	On Boxwood Mounts, Glass Covers	,,	**3/6** and **5/9**
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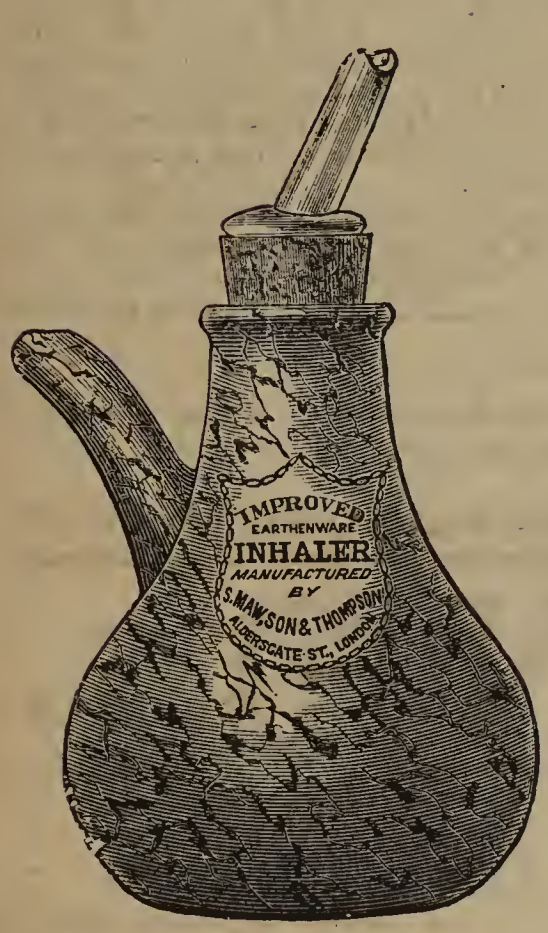

FIG. 8.

MAW'S IMPROVED.

FIG. 6.

MAW'S DOUBLE-VALVED.

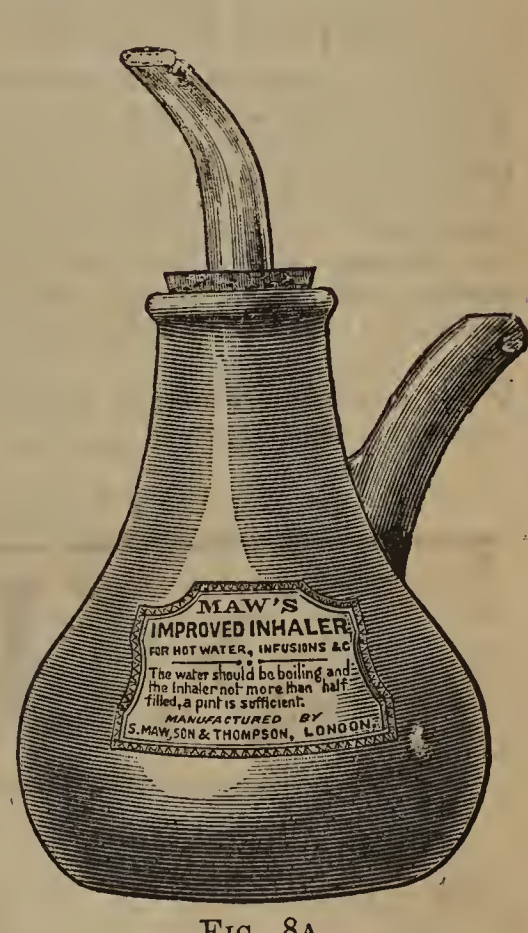

FIG. 8A.

MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.

Fig. 8.—Marbled, 32s. per dozen. Fig. 8a.—White, 21s. per dozen.

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PUMILINE (Pure Essence and Extract of Pumilio Pine).

Messrs. G. and G. STERN beg to announce to the Medical Profession, and also to Chemists and Druggists, that they have opened a depot at 11, Billiter Square, E.C., for the constant supply of PUMILINE.

STERN'S PUMILINE, after careful analysis by competent authorities, is proved to be the **Pure Essence** and the **Pure Extract** of the **Pumilio Pines** grown on the higher altitudes of the Alps in regions of perpetual snow, and an acknowledged remedy for **Gout, Rheumatism, Throat** and **Chest Affections.**

The system of Pine treatment for these ailments, in conformity with that so successfully carried out at Homburg, Ischl, Reichenhall, and at other Baths and Health-resorts on the Continent, has now for the first time been introduced into this country at the Hydro-Therapeutic Establishment at Farnborough, Hants. Baths and Inhalation Rooms have been erected for the special treatment by Pumilio Pine of patients suffering from Gout, Rheumatism, and Throat and Chest Affections; and this establishment is under the guidance and care of an able English Physician resident on the premises. **STERN'S PUMILINE** is the Pine Essence and Extract used at the Farnborough Establishment.

PUMILINE is much prescribed by German and Austrian Physicians, and has met with unvaried success. It has also been used in this country by Medical Men with equally good results, and is now freely prescribed.

Report of W. J. SYKES, Esq., M.D., on Pumiline:—

"London, *October* 10*th*, 1887.

"I have carefully examined Messrs. G. & G. Stern's **Pumiline**, or Pumilio Pine Essence and Extract, and find them, as represented, to be the pure products of the 'Pumilio Pine.'

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"I have also investigated the properties of **Pumiline** as a **disinfectant** and **deodorizer.** I find it a powerful **antiseptic** very effectually arresting decomposition. When vapourized it acts as a potent **disinfectant** and **deodorizer**, quickly destroying **miasmata** and other offensive emanations. From its agreeable odour it will be found especially valuable as a disinfectant in the sick room, whilst it will be found thoroughly efficacious for any other purpose for which a powerful disinfectant may be required."

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McK. & R.	DOZ. BOTTLES containing 25 PILLS.	DOZ. BOTTLES containing 100 PILLS.
Quinine, Bi-Sulphate ¼ gr.	5/-	16/-
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IN MOST ELIGIBLE FORM.

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Pinol, the oil or essence distilled from the needle of the Pinus Pumilio, a small shrub growing amid the perpetual snow of the Alps, is distinguished from the common pine oils, prepared from the larger pines of lower altitudes, by its delicate and permanent fragrance, the amount of hydrogen-peroxide it generates, and its superior medicinal properties. The Pumilio grows at 6,000 to 8,000 feet above the sea-level, and it is with preparations made from it that the baths and steam for inhalations are medicated at such prominent health resorts as Hamburg, Ischl, Baden-Baden and Reichenhall. It is these preparations that are given precedence by the leading Continental physicians. Referring to the Pumilio Pine in his great work on arboriculture, the late Dr. Jas. Brown wrote :—"It contains a fluid giving off a very fragrant smell, which is different in its perfume and qualities from the resin or fluid of any other pine tree."

Oil of Pumilio.

Health resorts.

The hygienic value of air laden with exhalations from the pines is known to all, and more especially for the phthisical and rheumatic. Pinol may be sprayed upon the moustache and clothing, or a few drops poured upon a blotting paper to medicate the air respired. It is warmly recommended in catarrh, influenza, graveds, ozœna, tonsillitis, and other throat troubles, chronic bronchitis, bronchorrhœa, consumption, rheumatism, gout, lumbago, sciatica, genito-urinary affections and diseases of the skin. Its odour is preferred by many to the choicest floral perfumes.

The Phthisical, etc.

A very good way to employ Pinol for purposes of inhalation is to pour 20 or 30 drops into half a pint of boiling water in a basin, stir well, and then add another half pint of boiling water. The steam may be readily enclosed and inhaled by surrounding the face and basin with a towel. It is considered excellent for those troubled with purulent expectoration. Pinol may also be used in a steam or spray apparatus, as a gargle (freely diluted), for fumigation, and as an embrocation and lotion. Fumigations of Pinol take precedence for pertussis. The drug may be given internally as well as applied externally. The dose for internal administration is three drops, on a lump of sugar. For cutaneous diseases it may be incorporated with Lanoline, or applied strong or diluted. In some cases a few drops are sprinkled on flannel wrung out of hot water and applied to the chest, or joint, etc.

How employed.

Supplied in ½-oz. and 1-oz. bottles, at 2s. and 3s. 9d. respectively. Subject to usual discount.

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Pinol Extract—also prepared from the Pinus Pumilio—is about the consistence of clotted cream. It is strongly redolent, decidedly medicinal in its properties, and freely soluble in water. It is used in baths, liniments, ointments, and plasters.

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$$C_6H_4\langle \begin{matrix} CO \\ SO_2 \end{matrix} \rangle NH.$$

Saccharin, the new and soluble substitute for sugars in diabetes, is no way allied to the carbohydrates, but is benzoyl sulphonic imide, which belongs to the class of aromatic derivatives. It possesses 300 times the sweetening power of cane sugar, and according to Prof. Stutzer, of Bonn, its sweet taste may be detected in 70,000 parts by weight of distilled water. Aducco, Mosso, Stadelman and others have shown that it is powerfully antiseptic. Physiological experiments made with it upon various species, including the frog, dog, and human beings, show that it exerts no deleterious action whatever, and is excreted from the kidneys unchanged within 24 hours after taking it, some of it appearing within 30 minutes. It allays the desire for sugar, and makes the diet of the diabetic as pleasant as if sugar were used. It is, as Sir Henry Roscoe declares, "the most remarkable of all the coal-tar products," but it is in no sense a food.

It has been prescribed in diabetes, mellitus, glycosuria, hepatic and renal affections, genito-urinary troubles (cystitis, etc.), obesity, and in many wasting diseases of children.

The favourable report upon the trials made with Saccharin by Dr. Leyden in the Berlin Hospitals have been fully endorsed by Dr. Stadelman of Heidelberg University, Prof. Salkowsky, of the Pathological Institute of Berlin, Prof. Stutzer of Bonn, and other distinguished scientific men.

Saccharin is supplied in tabloids ½-gr. each of the pure product, with sufficient soda to give it greater solubility. One or two tiny tabloids of Saccharin added to a cup of tea, coffee or cocoa—in lieu of as many lumps of sugar—will impart to it a sweet and delicate flavour, and leave a pleasant remembrance on the palate.

Supplied in tubes, each containing 12, at 4s. per doz. ; tubes containing 25, 8s. per doz. ; also Vinaigrette style (oval bots.), 100 in each, 24s. per doz. Subject to usual discount.

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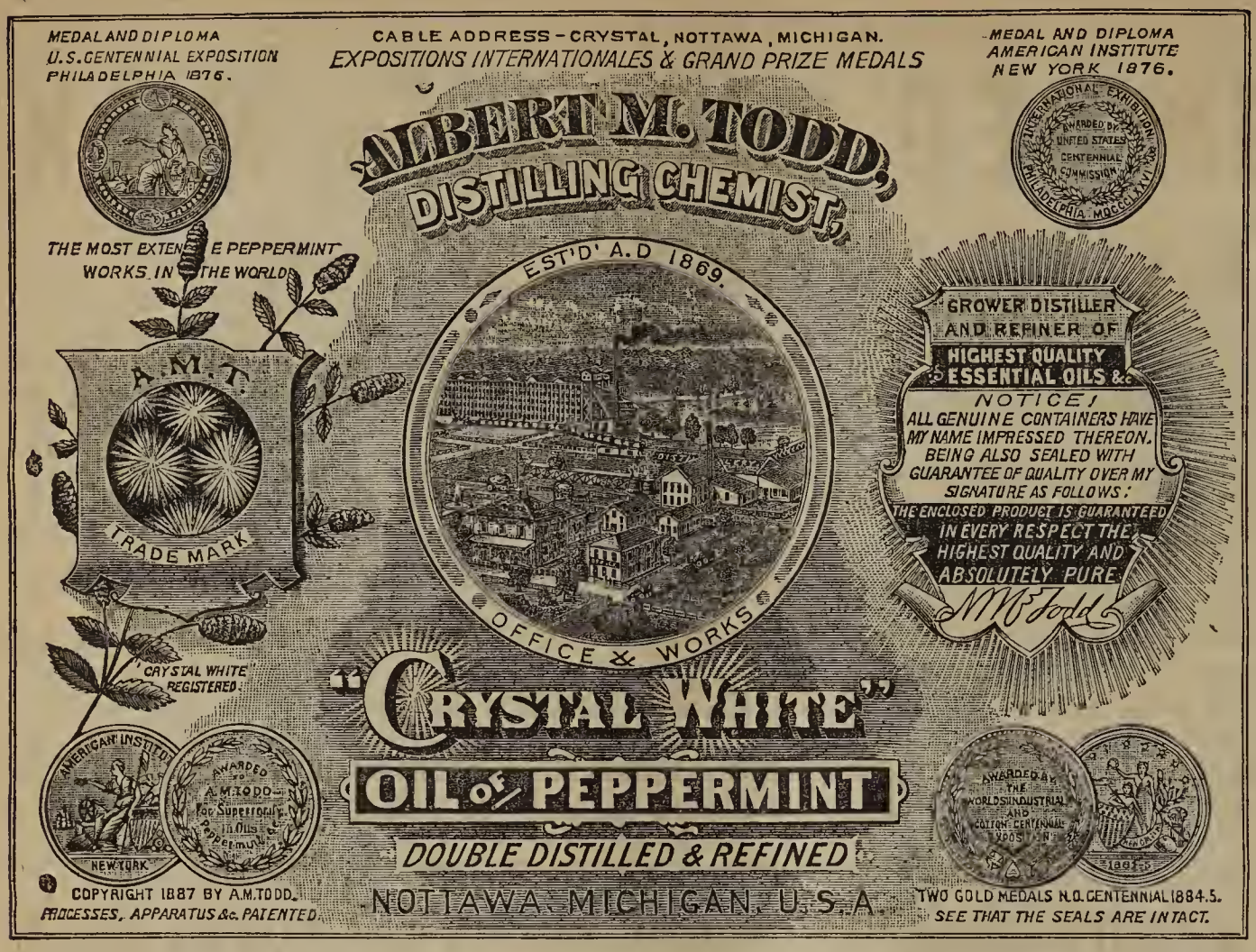

This quality is now obtainable at special introductory prices through the leading Wholesalers of Great Britain, in original bottles, sealed and guaranteed as stated, containing 1 lb., 8 oz., and 4 oz.

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The "**Crystal White**" **Double Refined** quality is **guaranteed positively** not only **absolutely pure, and in every respect the highest quality produced,** but also the **most economical,** less being required, while the highest results possible are quickly obtained.

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No.		Per doz.	Size.
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89.	Nickel Screw Capped Bottles	4/6	1/
90.	,, ,, ,, ,, ...	3/8	9d.
92.	,, ,, ,, ,, ...	2/6	6d.
161.	Boxwood Boxes, Acorn Shape	4/2	1/
162.	,, ,, Pedestal Shape, Screw Lids ..	3/11	1/
163.	Vegetable Ivory, Acorn Shape	5/	1/
200.	Boxwood Boxes, Pedestal Shape	3/	6d.
201.	,, ,, Barrel Shape, Screw Lids ..	3/11	1/
201B.	,, ,, ,, ,, Extra Large Cone	5/10	1/
202.	,, ,, Bullet ,, ...	3/11	1/
203.	,, ,, Cone ,, ...	3/11	1/
204.	Vegetable Ivory, Castle Shape	5/10	1/

No.		Per doz.	Size.
205.	Boxwood Boxes, Cone Shape, each in box ..	3/3	6d.
206	,, ,, as No. 203, Large Size ..	4/8	1/
207.	,, ,, Draughtsman Shape	4/11	1/
208.	Vegetable Ivory ,, ,, ...	6/6	1/
210.	Boxwood Boxes, Acorns, Nickel Plated Caps ..	5/	1/
211.	Vegetable Ivory Boxes, Acorns, Nickel Plated Caps	5/10	1/
212.	Boxwood Boxes, Bullet Shape, reversible end	4/8	1/
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209.—NICKEL PLATED PENCIL, WITH MENTHOL AT END, 1s. size, 4s. 6d. per doz.

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May be obtained through the Wholesale Houses at above prices. In ordering please quote numbers.
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PEPTONISED COCOA AND MILK

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PEPTONISED MILK

(PATENT)

These two preparations are made with pure rich PRE-DIGESTED Country Milk, and, by mere dilution with hot water, afford a delicious restorative beverage, the assimilation of which requires no digestive effort.

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Tins, 1s. 6d. and 2s. 6d. Obtainable everywhere.

DELECTABLE JUJUBES, VOICE JUJUBES, AND GLYCERINE PASTILLES

Put up in 4-lb. Decorated Tins with Glass Lids, *TINS FREE*, are now being inquired for by buyers from all parts of the world. They are not surpassed in quality by any maker, and give entire satisfaction.

MEDICATED AND HIGH-CLASS LOZENGES, of every kind,

Sent out in 2-lb. or 4-lb. Bottles, Bottles Free ; or in Tins, from 10-lb. upwards.

LIME FRUIT TABLETS. MALT TABLETS.

ACID DROPS & BEST QUALITY BOILED SUGARS of EVERY KIND

ORIGINAL CHLORODYNE COUGH LOZENGES.

PENNY SUGAR WORM CAKES, suitable for either *children* or *adults*. Have an immense sale, keep in any climate, and please everybody. Manufactured by

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As they are a clear addition to business, many of them not taking the place of goods now sold by Chemists.

IDRIS' FRUIT CORDIALS AND LIQUEURS.

May be used with Hot or Cold Water, and in Winter and Summer. About 30 Varieties. *(See List.)*
IN BOTTLES, ELEGANTLY LABELLED AND CAPSULED.

IDRIS' PALATABLE LIME JUICE.

Lime Juice Cordial and Limetta.

Manufacturing Chemists, Mineral Water Makers, Syphon and Seltzogene Manufacturers, Export and Import Merchants,

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Any Wholesale or Retail Chemist who publishes a Monthly or Annual List of Prices for the use of the general public, or Almanack, will oblige Messrs. A. ROWLAND & SONS, of 20, Hatton Garden, London, by sending them a copy of the last issue and stating number of copies printed and price of advertisement to occupy page or half page facing matter, or on outside back cover. Counter Bills can always be had

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Always Uniform and of Exceptionally Fine Quality.

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CONCENTRATED FRUIT ESSENCES

Five or Six times the Strength of, and Vastly superior to, all others.

SOLUBLE ESSENCES

Much Stronger and Infinitely Superior in Flavour to all Imitations, consequently cheaper in use.

FRENCH CREAM GUM EXTRACT.

(Protected by Royal Letters Patent.)

For producing froth on Beers, Aerated Waters, &c., &c.

ENGLISH SANDAL WOOD OIL.

Absolutely Pure and always uniform.

Dr. HENDERSON, of Glasgow, writes:—"It is a pure oil of a high character. I have tried it in numerous cases of gonorrhœa; it was rapidly successful in all. The oil disagreed with no one."

THE LANCET states:—"It is admirably adapted for use as a medical agent."

THE BRITISH MEDICAL JOURNAL states:—"It is unusually free from disagreeable taste."

THE CHEMIST AND DRUGGIST states:—"The fact that Dr. Henderson speaks highly of this oil is the best proof of its therapeutic activity."

ARTILLERY LANE, BISHOPSGATE, LONDON, E.C.

CHEMICAL NOTES ON TEA.

BY DR. B. H. PAUL AND A. J. COWNLEY.

So far as the chemistry of tea has been studied its most important constituents appear to be an essential oil to which the aroma is due, theine, legumin, and an astringent substance analogous to tannin. With the exception of theine, however, little is known of the chemical characters and relations of these constituents or of the mode in which the quality of tea is influenced by them. For instance, what is commonly spoken of as the "strength" of tea is a tolerably vague quality in itself, and no relation has yet been ascertained to exist between it and the amount of any particular constituent. Considering the physiological properties of theine it might be supposed that the "strength" of tea depends to a considerable extent upon the amount of this substance, and some probability is given to that opinion by the great variation in the published statements as to the proportions that have been obtained from different kinds of tea. According to the earlier determinations by Mulder, Chinese and Java tea were represented to contain less than 1 per cent. of theine. Subsequently, Stenhouse found from 1 to 2 per cent. in a number of samples examined by him, while Peligot obtained from 2·5 to 4, and in one case as much as 5·84 per cent. of theine. On examining the methods by which these results were obtained they all appear to be open to suspicion of inadequacy to meet on the one hand the difficulty of obtaining theine in a sufficiently pure condition, and on the other hand that of extracting the whole of it in such a condition.

The method of sublimation by which Stenhouse* sought to determine the amount of theine in tea is not capable of furnishing correct results, since the greater part of the theine is decomposed, and this circumstance will account for the low results obtained by him. Peligot's method† of treating an aqueous infusion with basic lead acetate, and evaporating the filtrate after separating excess of lead, was equally unsuitable for the determination of theine, since its extraction by water is incomplete, and while the quantity thus obtained cannot be rendered pure by crystallization without loss, there is also a risk of obtaining too high a result if the product is not sufficiently purified before weighing. Consequently the data of both these experimenters cannot be relied upon for accuracy, and the results of some preliminary experiments furnished us with evidence that a further investigation of the subject was desirable. Even Zöller's‡ more recent examination of a sample of tea from the Himalayas, in which he found 4·94 per cent. of theine, does not sufficiently remove uncertainty as to the amount of theine in average tea, for his memoir suggests that the tea examined by him was of exceptional quality. Moreover, his method of extracting the theine by thoroughly disintegrating the leaves with strong sulphuric acid does not appear well adapted for the purpose. Liebig was of opinion that theobromine was also obtained from the Himalaya tea examined by Zöller, though this point was not settled conclusively, since the quantity of material was too small for the purpose. In two other samples Zöller was unable to find any trace of theobromine. In our analyses of tea we have always endeavoured to trace the presence of theobromine, but so far we have in every instance obtained only negative results. It must, however, be mentioned that as the quantity of tea operated upon for the determination of theine is but small, a minute proportion of theobromine might in that case escape detection, and we, therefore, propose to operate upon large quantities to decide this point.

In the course of an inquiry undertaken for the purpose of ascertaining the circumstances that determine the differences of "strength" in tea, one of the points to which we directed our attention was the extraction of the theine in such a way that precise analytical results could be obtained, admitting of a comparison of different kinds of tea in regard to the percentage of theine. After several trials we found that the method we had previously adopted for coffee* was capable of furnishing satisfactory results, and that with careful manipulation the amount of theine in tea could thus be determined with considerable accuracy.

For this purpose 5 grams of powdered tea is moistened with hot water, well mixed with 1 gram of hydrate of lime, and the whole dried on a water-bath. The dry residue is then transferred to a small percolating apparatus and extracted with strong alcohol. The clear liquor is to be evaporated to remove alcohol, and the remaining water solution, measuring about 50 c.c., mixed with a few drops of dilute sulphuric acid, which separates a trace of lime and partially decolourizes the liquid. After filtering the slightly acid solution, it is transferred to a separator and well shaken with chloroform, which gradually abstracts the theine. This part of the operation requires particular care, for though theine is freely soluble in chloroform it is necessary to shake the acidified water solution with several successive quantities of chloroform in order to remove the whole of the theine. Unless the quantity of theine is very large, about 200 c.c. of chloroform will be sufficient for 5 grams of tea, and that should be used in 5 or 6 separate portions, testing the last portions by distilling off the chloroform in a weighed flask until it is found that there is no more theine taken up. The whole of the chloroform solution is then to be placed in a stoppered separator and shaken with a very dilute solution of caustic soda. This will remove a small quantity of colouring matter and render the theine solution quite colourless, so that on distilling off the chloroform from a weighed flask the theine remains in a condition fit for weighing. When the operation is carefully carried out the theine will be perfectly white. In this way we have been able to obtain results of great uniformity.

Our first experiments were made with Indian and Cingalese tea, the general result showing that both kinds contained a much higher percentage of theine than has hitherto been generally supposed, and that the variation in the amount of this substance was not considerable. In this respect, however, there seems to be a marked difference between tea and coffee; the amount of theine in tea is by no means a constant quantity, and so far as the tea of India and Ceylon is concerned it varies from 3·22 to 4·66 per cent. This is taking the tea in the ordinary air dry condition in which it is met with in commerce. The following table gives the results of our determinations in twenty-eight samples that were selected for this purpose as representing a wide range of quality,

* *Phil. Mag.*, xxiii. (1843), 427.
† *Ann. Chim. Phys.*, [3], xi., 138.
‡ *Ann. Chem. Pharm.*, clvii., 185.

* *Pharm. Journ.*, [3], xvii., 921

as may be understood from the fact that the prices realised by the corresponding parcels in public sale varied from 7*d.* to 3*s.* per pound. The sample No. 10 was tea of exceptionally fine quality, that was valued at 6*s.* or 7*s.* per pound, and the sample No. 4 consisted of the hairs detached from the leaves in sifting:—

	Approximate elevation of place of growth.	Moisture per cent.	Theine per cent.	
			Original tea.	Dry tea.
Ceylon Tea.	Ft.			
1. Penhros	2500	6·8	4·56	4·89
2. F.L.C.	—	6·0	4·56	4·85
3. Nahalma	300	5.6	4·54	4·80
4. Hairs from tea leaves	—	6·6	2·40	2·57
5. Hardenhuish Pekoe	3500	3·8	4·08	4·24
6. Woodstock Pekoe Souchong . . .	4200	3·6	3·44	3·57
7. Radella Broken Pekoe	4800	4·6	4·10	4·30
8. Morton Pekoe . .	400	4.2	3·98	4·15
9. Penhros Broken Pekoe.	2500	6·4	4·64	4·96
10. Strathellie Orange Pekoe	2000	5·4	4·10	4·33
11. Nahalma Orange Pekoe	300	5·4	4·06	4·29
12. Venture Orange Pekoe	4300	5·4	3·74	3·95
13. St. Leys Pekoe Dust	4600	5·6	3·46	3·66
14. Venture Pekoe Souchong	4300	4·8	3·40	3·57
15. Venture Broken Orange Pekoe. .	4300	6·6	3·98	4·26
16. Calsay Pekoe Souchong	5000	6·2	3·22	3·43
17. Venture Pekoe . .	4300	5·6	3·48	3·68
18. St. Clair Orange Pekoe	4200	4·6	3·90	4·09
Indian Tea.				
19. Pekoe tips, picked out	—	7·56	4·27	4·62
20. Broken Pekoe . .	—	7·00	4·48	4·81
21. Pekoe	—	6·40	4·16	4·44
22. Orange Pekoe . .	—	4·80	4·66	4·89
23. Pekoe	—	5·60	4·48	4·74
24. Broken Pekoe . .	—	4·80	3·76	3·95
25. Pekoe	—	5·40	3·66	3·86
26. "Weak" tea . .	—	6·80	4·06	4·35
27. "Strong" tea . .	—	5·80	4·18	4·43
28. Mixture	—	6·00	3·64	3·87

At present we have not had an opportunity of examining many samples of Chinese or Java tea that could be accepted as authentic, but so far as we have been able to judge the amount of theine is less than in the tea of India and Ceylon. We intend, however, to continue the inquiry in that direction as soon as we can obtain suitable samples. But, so far as the tea of India and Ceylon is concerned, it is at least evident from the data above given, as compared with the prices mentioned, that the marketable value of tea is not to any great extent dependent on or proportionate to the amount of theine it may contain, however important that constituent may be in other respects. Neither can the "strength" of tea, as that term is generally understood, be taken as proportionate to the amount of theine. This is evident from the results of the analysis of the two samples, 26 and 27, which were selected by experienced judges of tea to represent extreme cases of difference as to strength. The amount of theine in 27 is greater than in 26, but to such a small extent that the difference in strength of the tea represented by those samples could not be ascribed to the theine they contain.

It appears to be much more probable that the "strength" of tea is chiefly determined by the amount or condition of the astringent constituent, the precise nature of which is at present only partially known. Moreover, when the mode of preparing tea is considered it is also probable that this quality of "strength" may be largely influenced in degree by the manipulation of the leaves in the process of manufacture, which comprises stages of fermentation and heating in the moist state in contact with atmospheric oxygen, both of which are conditions likely to induce alteration of material analogous to ordinary tannin. But before any definite opinion on this point can be offered in place of the general probability above suggested, it will be necessary to acquire a better knowledge of the chemical nature of that constituent of tea leaves which in some respects resembles ordinary tannin.

The commercial value of tea is at present estimated by a combined consideration of several factors, among which appearance counts to a considerable degree. In this respect the size of the leaves, indicating their age, and likewise the presence of what is termed "tip," consisting of the unexpanded leaf buds, serve as indications by which tea is classed partly as Souchong or Pekoe, and partly also as varieties of those kinds of tea. In addition there is also the process of tasting procured by tea brokers. This consists in preparing infusions of the different samples, much in the same manner that tea is commonly used, and then forming a judgment as to the value of the samples according to the aroma, flavour and other characteristics of the corresponding infusions. This is an art that is practised with a surprising degree of precision, so that the results arrived at by different operators agree in a very remarkable manner. In carrying out the broker's test, tea is infused for five minutes in boiling water in the proportion of about 43 grains to 3½ fluid ounces of water. The infusion is then poured off from the leaves into a cup and the value of the tea estimated by its taste. In this operation the soluble constituents of the leaves are only partially extracted, and while more perfect exhaustion of the leaves will give about 35 per cent. of extract, the amount taken out in the ordinary broker's method of testing does not amount to more than 20 per cent. on the average. Hence it is evident that attempts to value tea on the basis of the total amount of extract obtainable by treatment with boiling water must be entirely fallacious and useless for any practical purpose. In respect to the amounts of extract thus obtainable from tea of different qualities, there is not in reality any such difference as would afford indications of the actual differences in value. Peligot and others have made determinations of this kind, showing that different kinds of black tea yield from 24 to 47 per cent. of extract, or on the average 34 to 40 per cent., but these data have little practical value. It is indeed not by the perfect extraction of tea that its value can be estimated. This must be sought for within the limits of extraction which obtain in the ordinary methods of using tea, as is the case in the broker's method of testing, which fairly represents ordinary practice in the use

of tea, though the infusion is then made stronger than it is generally drunk.

To obtain some idea of the extent to which the constituents of tea are extracted under these ordinary conditions we have made analyses of the infusion thus prepared, and have ascertained as a general result that the 20 per cent. of extract taken out by the infusion will contain about one half of the theine present in the tea used. An ordinary breakfast cup of equally strong tea infusion, measuring about eight ounces, would therefore contain two grains of theine, or thereabouts. The rest of the theine is left in the spent leaves, and it requires repeated treatment with boiling water to extract the whole quantity. This is no doubt one of the reasons why the amount of theine in tea has been under estimated in so many instances, since experimenters have operated upon a water extract for its determination. In one instance we found that the residual leaves of tea which had been used in the customary manner contained as much as 1·7 per cent. of theine, and in another case leaves exhausted as far as practicable by percolating with boiling water still contained as much as 0·13 per cent. calculated on the original tea.

THE UTILIZATION OF WASTE PRODUCTS.*

BY ALFRED H. ALLEN, F.I.C., F.C.S.

President of the Society of Public Analysts.

(*Concluded from page* 379.)

In treating coal-tar, the first process is one of distillation, the liquid products of the operation being collected in separate fractions. Evidently the constituents of low-boiling point will be the first to distil, and by repeating the distillation, and increasing the number of fractions in which the product is collected, a very fair separation of many of the constituents of coal tar can be effected. As will be seen on reference to Nickel's coal-tar tree, the first fraction obtained by the distillation of coal-tar is known as "first runnings," and this is followed by the "light oils." From these fractions are obtained a number of interesting products, the chief among which is the liquid hydrocarbon known as benzol or benzene. This must not be confounded with the product commercially known as "benzoline," which is a naphtha obtained by somewhat similar means from petroleum, and is quite different in chemical character. From benzene and its immediate homologues is obtained nitrobenzene, a body which from its odour has been inaccurately termed "artificial oil of bitter almonds," and which finds a large application in the scenting of soap, etc. By appropriate treatment this nitrobenzene is converted into aniline, the starting point of the numerous colouring matters familiarly known as the "aniline dyes," a term which is sometimes incorrectly extended to include all the other coloured products obtainable from coal tar. Benzene—through aniline—is also the starting point of many of the so-called azo-dyes, which yield the magnificent yellows, oranges, and browns which have of late been so popular, while azo-reds are derived from the constituents of coal-tar known as xylene and naphthalene.

The next product of the primary distillation of coal-tar is the "carbolic oils," so called from their most important ingredient being the well-known carbolic acid or phenol, to the antiseptic characters of which we owe the stamping out of the cattle plague and the rendering practical the antiseptic treatment of disease. But carbolic acid is itself the starting point of an important series of artificial products. Thus it yields salicylic acid, which in its medicinal uses is scarcely less important than carbolic acid itself. By treatment with nitric acid it yields picric acid, extensively used as a yellow dye, but far more largely employed as the basis of the French explosive "mélinite." The colouring matter known as aurin and the products known as the eosin dyes are also remotely allied to carbolic acid. One of these bodies, called fluorescein, has but little dyeing power, but in solution exhibits a fluorescence or "bloom" to an almost incredible extent. Those who have observed the wonderful fluorescent fountain (exhibited by Mr. I. Levinstein in the Chemical Department of the Manchester Exhibition), the water of which is colourless, but exhibits a brilliant yellowish-green fluorescence, will be interested to know that the effect is produced by ordinary water containing 1 part per 1,000,000 of fluorescein.

Another of the leading constituents occurring ready formed in coal-tar is a hydrocarbon called naphthalene, now familiar in the form of white candle-like cylinders, and used in the production of the albo carbon light. In Sheffield the choking of the gas mains by deposits of naphthalene has recently brought home to us in a striking manner the property possessed by this hydrocarbon of volatilizing at the ordinary temperature.

The higher fractions obtained by the distillation of coal-tar yield anthracene, which is the starting point of alizarin and its analogues already mentioned, but a large proportion of this part of coal tar must still be regarded as practically unutilized.

The pitch which is obtained as a residue from the distillation of the tar receives extensive applications, with which you are all familiar.

It is a lamentable fact that notwithstanding the enormous amount of talent and ingenuity devoted to the manufacture of coal-tar products, and the immense capital invested in their production, the whole industry is now languishing in the gravest manner, and there are not wanting leading men who advocate the simple burning of much of the tar as a means of getting rid of it, seeing that its treatment cannot now be profitably conducted. Of late years several very large works have been established, not for the purpose of producing coal gas, and therefore obtaining the tar products as one of the residuals, but for the express purpose of obtaining tar, and these works have thrown so much benzol and other primary tar products on the market as very gravely to affect the industry. To make matters worse for those interested, the ammonia, which is another of the residuals produced in the manufacture of illuminating gas, has now fallen enormously in value, the market price of sulphate of ammonia being now about £11 10*s.* per ton, while a few years ago it realized £22 per ton. This fall is largely due to the production of ammonia from the waste gases of blast furnaces consuming bituminous coal. This is done in Scotland to a very large extent, and Messrs. Baird and Company, at the Gartsherrie Iron Works, and the Eglinton Iron Company, at the Lugar Iron Works, two firms which are really identical, now produce an enormous quantity of sulphate of ammonia from their blast furnace gases. Another product of the cooling of this gas is a kind of tar. This differs from ordinary gas works tar in very important respects. It yields practically no benzol, naphthalene or anthracene, and the carbolic acid of ordinary coal tar is represented by the analogous substance cresylic acid, together with products having an analogy to those characteristic of wood tar. The substance known as creasote, a word which signifies "flesh preserver," was originally obtained by Reichenbach from wood tar, and when carbolic acid was discovered by Runge in coal-tar, it was for a long time confounded with this product, and received the name of "coal-tar creosote." It is probable that the antiseptic properties of carbolic acid itself would not have received such widespread and prompt recognition, but for its confusion with the original wood tar creasote.

Under a patent I have recently obtained in conjunction with Mr. Angus, one of the partners of the Eglinton Iron Co., the constituents of blast furnace tar analogous

* A paper read before the Sheffield Literary and Philosophical Society.

to carbolic acid and wood creasote are now about to be produced on a large scale, and will be known in commerce as "neosote," a name which signifies "new preserver" or "new preservative," and may serve to indicate the similarity of the article to creasote. It is one of the advantages of the production of this neosote that its extraction from the tar renders the residual tar or oil more suited for its application to the production of the "lucigen" and "luminator" lights. These new lights consume any cheap kind of oil, and are fed with a blast of air. One of them is now on exhibition at the Crystal Palace, and in other instances where it is used I am informed it is found highly successful.

It is not so long ago that blast furnace gases were allowed to burn freely at the mouths of the furnaces, and the utilization of them for heating the boilers and blast was a distinct advance. With furnaces consuming coke this is all that can be done, but the successful utilization of the tar and ammonia condensable from furnaces consuming bituminous coal is a further step of great practical importance.

But while interesting ourselves in the utilisation of gases, we must not forget the enormous quantities of slag which form another secondary product of the reaction in the blast-furnace. It is calculated by Mr. Charles Wood, of Middlesbrough, that twenty-five cwt. of blast-furnace slag is produced for every ton of pig iron obtained, which in the year 1881 would mean a production of 8,000,000 tons of slag. The space occupied by this mass would, when loosely tipped, be nearly twice that of the great pyramid, while the bulk of the pig iron would only be about one-sixth of the size of the pyramid. The enormous quantity of this material produced has doubtless stood in the way of its utilization, and where, as in Northamptonshire, there is a constant demand for it for road making purposes at a fairly remunerative rate there is not much encouragement to go further with it; but at Middlesbrough it has been found of great service in the construction of the breakwater at the mouth of the Tees, for which purpose about half a million tons of slag are used annually, and a similar class of work is being conducted near Barrow with the slag from the hematite furnaces, which, however, is less suited for the purpose. The slag used at the Tees breakwater is run from the furnaces into square iron waggons, in which it solidifies to form blocks weighing about 3½ tons each. By running the molten slag on to a revolving iron table Mr. Wood converts it into "slag-shingle," which is found to be most valuable for the manufacture of concrete, and is extensively used for this purpose in connection with the Tees breakwater. By suitable means the slag is also reduced to a condition of sand, and when mixed with lime this forms a hydraulic cement which hardens in a perfect manner. Bricks made in this way require no burning, and are found to stand very well. In consequence of the dock extension, however, the works where the slag bricks were made has been purchased by the railway company, and so the process is temporarily suspended, but somewhat about 200,000,000 bricks have been manufactured. By projecting a blast of steam across molten slag in the act of falling the slag becomes converted into globules, and these are drawn out into long threads of an extremely delicate character. The slag in this form is almost pure white in colour, and has much the general appearance of cotton-wool, but it has not the same elasticity, and once crushed will not recover itself. Mr. Wood informs me that the slag wool is now being manufactured at the rate of 15 to 20 tons per week. It is used as a non-conducting material for covering boilers and so forth; and to put under flooring to deaden the sound. At the works of the Brittain Glass Company, in Northamptonshire, blast-furnace slag is run in a molten state into a glass-furnace heated by Siemen's gas, and is there mixed with about its own weight of sand and alkali, and made into glass. The slag ornaments which are familiar to all are another product of a similar kind.

But blast-furnace slag is not the only slag which has lately been utilized. In Sheffield, we all know that till recently the only pig-iron fit for use in the Bessemer process was that which contained but a very small proportion of phosphorus. The Cleveland iron, in which phosphorus is present to an extent between 1 and 2 per cent., was utterly unfit for the purpose; but with the basic process, devised by Thomas and Gilchrist, the presence of phosphorus, so far from being an objection, is, within limits, rather an advantage. This has shifted the centre of gravity of the heavy steel trade to Middlesbrough, where, under the management of my friend Mr. Arthur Cooper, the North Eastern Steel Company have established extensive works for producing steel by the basic process. The slag which results from this operation contains a considerable quantity of phosphate of lime, and a number of ingenious processes have been devised for recovering this in a comparatively pure state. It is now found, however, that if sufficiently finely ground, and freed from the minute particles of metallic iron disseminated through it, the slag is at once suitable for use as a manure. At the North Eastern Steel Company's works they are making from 800 to 1000 tons per week of the slag, and have just erected a large mill for grinding this into powder. They have already shipped upwards of 60,000 tons of the raw slag to Germany. There is no doubt of the valuable character of basic slag as a manure, but farmers may be excused for being somewhat sceptical of the value of many of the materials offered them, as it seems to be held by many of their professed friends that anything which is good for nothing else is sure to be suitable for manure. Of course, there was a basis of truth in the manurial value attached to sewage, but it is now well known that the practical value was greatly over-estimated, and that those responsible for the disposal of the sewage must be content to get rid of it with as little expense as possible, and not dream of making a profit.

Another waste product which is deservedly appreciated as a manure consists in the sweepings and combings from woollen manufacturies, known as "shoddy." Formerly this was applied to the land in the raw state. The grease with which it was saturated acted as a preservative, and therefore detracted from its value as a manure, but no one would now think of neglecting to extract the grease from the wool before employing it on the land. The recovered grease is now recognized as a valuable secondary product, and when purified the stearin or solid portion makes its appearance in the form of night-lights, and the olein or liquid part goes back to the woollen manufacturers to be used again.

In the manufacture of soap, glycerine is produced in enormous quantities as a secondary product. Of the two chief processes of treating fats, one produces good glycerine but inferior soap, and the other produces good soap but inferior glycerine. The quantity of glycerine hitherto thrown away in the soap-leys has been something enormous, but now much of it is recovered. Thus at the works of Messrs. Gossage, at Widnes, the largest soap works in the world, the soap-leys are boiled down, the salt separated, and the concentrated liquid distilled, whereby glycerine is obtained, which receives an enormous application in the manufacture of nitroglycerine. This, when soaked up in one-third of its weight of a porous earth, called kieselguhr, forms the well-known explosive, dynamite, which is produced in one single works to the extent of several tons per day. The glycerine produced from the waste soap-leys at Messrs. Gossage's works was often found unsuitable for its intended purpose in consequence of containing sulphocyanides and other cyanogen compounds. By a process, patented by myself and Mr. Benjamin Nickels, these products are wholly removed from the soap-leys, and thus a glycerine can be obtained from the impure source employed at Widnes as good in quality as that of any other origin. Curiously enough this process, which has

been now successfully at work at Widnes for some time, will shortly become unnecessary, owing to the introduction of an improved process of preparing the alkali used for saponifying the fat. By this process, due to Mathieson and Hawliezek, it will be freed from the objectionable sulphur and cyanogen compounds, which hitherto had passed into the glycerine. At the same time the cyanogen compounds are destroyed they will be converted into the useful form of ammonia. Truly "the whirligig of time brings round its revenges."

MERAN AS A HEALTH RESORT.*

"Go to Meran and eat grapes" is the advice given to many patients at Carlsbad, Marienbad, Kissingen and Tarasp. Others who have bathed in or drunk the mineral waters at these places, are ordered to go to Meran by their physicians with a view to enjoy an "after-cure" in change of air and scene. Many sufferers, to whom mineral waters bring no relief, visit Meran for the sake of its climate, more especially in winter. In the autumn it is largely frequented by tourists, who are attracted by its beauties. Few spots in the Tyrol are more charming than Meran, nor does any one present such varied points of interest. The invalid with a delicate chest and the sightseer with an insatiable curiosity, the student of history and the student of science, can all find at Meran something to benefit or interest them, something to invigorate their frames or afford matter for fruitful speculation and thought.

Though Meran has lost the importance it possessed while the capital of the Tyrol, it is no longer the dwindling place which it was for years. Since the opening, in 1871, of the branch line of railway between it and Botzen the number of visitors has multiplied, and new houses and hotels have been erected to accommodate them. As many as thirty villas have been built during the year that is past. The drawback now seems to be the too rapid growth of the place. A health resort loses many attractions as it increases in size. The drainage almost invariably deteriorates as house is added to house. Thus the loveliest spot may be ruined by over-popularity. In notices of Meran the season is said to begin in October and end in April. This is not quite accurate. According to Dr. Pircher, one of the resident physicians, the season lasts the whole year round; in other words, there are classes of ailments for which a sojourn here is desirable in spring, summer, autumn and winter. For the largest number of invalids, however, it is a place of resort during the winter months. The cheapest and most certain "cure" there is its climate.

The grape cure season begins in September and continues to the end of October. It has been practised at Meran for fifty years. Like other novelties in medical treatments, this form of cure was once absurdly overrated and misapplied, just as hydropathy was till persons quite as ignorant as Priestnitz were compelled by experience to admit that to drink cold water and envelop one's self in wet sheets was not a sovereign remedy for every malady. When writing about Baden and Vöslau I mentioned how the grape cure was pursued at both places. At Meran, however, the cure is conducted in a still more serious fashion. The grapes themselves are better adapted for the purpose than those to be found elsewhere. They resemble English hot-house grapes more than any other grown on the Continent in the open air. They are very pulpy and luscious. They are carefully picked, and they are cheap, the average price per pound being 3*d*.

Two physicians practising at Meran, Dr. Kuhn and Dr. Pircher, have written about the grape cure as pursued there. They are both men of note and experience in their profession, and they differ in opinion on an important point. Dr. Kuhn states that the grape stones are not to be swallowed on any account, and he adds that if swallowed they are certain to upset the digestion. Dr. Pircher, on the other hand, intimates that swallowing the grape stones does good instead of harm by facilitating the digestive processes. Some other doctors, I believe, tell their patients to please themselves in this matter. Another disputed point is whether the expressed juice of the grapes may not be taken with advantage. Dr. Pircher replies with an emphatic negative, threatening those who swallow the juice with colic as a penalty. Dr. Kuhn is quite as emphatic in recommending those persons to take the juice whose mouths have been irritated by continuously eating grapes. As regards the cure itself, it is not so pleasant as it sounds, and I write this after an experimental trial extending over several days. All the doctors agree that no effect will be produced unless two pounds of grapes are eaten daily. The *maximum* dose is nine pounds. I managed to eat about five pounds, and I thought that I had done enough for an experiment. I was quite satisfied in one respect. I should imagine breaking stones at the roadside to be a somewhat monotonous as well as exhausting employment, yet I can well suppose that a moment arrives to a patient under the grape cure when such a form of toil seems preferable to that of eating grapes all day. But the patient is not always relieved from toil when the day ends. He is haunted with grapes in his sleep, and dreams of having to eat a double dose or die.

The first thing the grape eater finds is that his appetite is not increased. He may have been told that he will feel the more hungry the more grapes he eats, but his experience will probably be similar to that of an American boy with oysters. This boy had been told that eating oysters gave one an appetite for dinner. He complained that after eating half a bushel he did not feel so hungry as when he began. The swallowing of from two to eight pounds weight of grapes induces a sensation of complete satiety. Our eighteenth century writers were fond of depicting how soon and sadly all pleasures cloyed when indulged in to excess. If they could revisit Meran during the grape cure season, they would find plenty of subjects wherewith to point such morals. But it may be supposed that living entirely upon grapes has many compensations. Vegetarians are fond of asserting that their heads are so clear and light, and that they have pleasures in life unknown to the feeder upon meat, and they are also fond of eating eggs and cheese and of drinking milk, things which cannot, I think, be classed as vegetables by any one except a very light-headed vegetarian. As a diet grapes may be fairly called light: yet the effect of eating them is heavy. If vegetables produce as many unpleasant sensations, which I should consider most probable, then the meat eater is to be envied both by the eater of the fruit or vegetables. He is generally unconscious of the sufferings from flatulence which frequently follow a vegetable diet, and his mouth is not irritated as is that of the eater of grapes.

I have styled the grape cure a serious one; I must add that it requires the exercise of much patience in those who follow it. Dr. Pircher is minute in his directions to patients; they are not doing their duty if they merely swallow grapes in a rapid and unmethodical manner. He tells them to be careful that the bunches are freshly cut, and also that "they must take each grape separately, examine it carefully in order to ascertain that it is quite ripe and that it does not contain any insect, the presence of an insect being indicated by a perforation of the skin. When the grape is placed in the mouth it must not be bitten, as is generally done, but it must be gently pressed by the tongue against the hard gums and sucked so as to draw out the juice; the grape skin must be spat out." He goes on to add, as I have mentioned already, that the stones are to be swallowed, and he continues by giving a warning against squeezing the skins between the teeth. In this case, as in many others, Dr. Pircher displays that fondness for detail which is characteristic of the medical

* Extract from a series of articles on "Austrian Health Resorts" in the *Times*.

writers in German, who consider themselves to be much more profound than their English brethren. No English medical man would think of telling a patient how to eat grapes, any more than he would think of telling them, as Dr. Hlawacock does in his work on Carlsbad, that it is wise to carry an umbrella when rain threatens. An English medical man does not assume that he is addressing children when he writes a guide to a watering place. A German one is at once more paternal and prosy. While quoting what Dr. Pircher has written, I should not omit to add a calculation which I made. If grapes are eaten as he directs, the average rate of consumption will be one a minute. In a pound of the grapes supplied at Meran there are about three hundred. Now the patient begins with one kilogramme, which is upward of two pounds, and he takes an additional pound daily till the *maximum* dose of nine pounds is reached. On the first day the task is comparatively simple. After ten hours' steady exertion the two pounds can be disposed of in strict obedience with the doctor's precise orders. But by the time the dose reaches five pounds the problem occurs of how to eat the grapes at the rate of one a minute in the course of a day of twenty-four hours, seeing that twenty-four hours will have elapsed before the whole are consumed. When the dose reaches eight pounds sixty hours will be required to take it in due form. Dr. Johnson said of Shakespeare that "panting time toils after him in vain." At Meran the grape-eating patient must pant after time, and do so all in vain. I may hazard the conjecture, by way of helping to solve the problem, that the patients at Meran eat grapes quicker and less systematically than they are enjoined to do in the pages of Dr. Pircher's work.

Among other forms of cure in vogue in Meran the milk and whey cures are pre-eminent. Meran cows' milk is remarkable for its excellence; the whey made from goats' milk here is remarkably rich in sugar. The patient who is under a milk diet gets milk alone; but he gets plenty of it, the dose being a quart nearly every three hours. If after existing on milk for a week the patient longs for something more substantial, he is allowed a roll or two soaked in milk; at the end of a fortnight he is given a little meat, and after three weeks' treatment he is either quite recovered or he ought to be, the fault being his own if the cure is not complete. Milk is obtainable at different times in the year; the period of the whey cure, however, begins in April and ends with May. Whey is drunk in the morning, and some mineral water is often taken along with it. Those persons whose cases are not adapted for the milk or whey cure may find benefit from koumiss prepared from cows' milk. The dose at the beginning of the treatment is an imperial quart taken in two portions daily, the one in the morning the other in the afternoon. The quantity taken is gradually increased till the daily dose is three imperial quarts. All the forms of cure I have named are not peculiar to Meran, though they are pursued here in a more systematic fashion than in other places.

The last I have to mention cannot be had in like perfection elsewhere. It is a plant-juice cure, and is available in the spring only, when certain plants unfold their first green leaves on the slopes of the Alps. The juice is expressed from them and the patients drink it. It may interest the botanist to learn the names of the plants so employed; they are *Achillæa Millefolium*, *Nasturtium aquaticum*, *Rumex acetosa*, *Ruta graveolens*, *Leontodon taraxacum*, *Urtica dioica*, and *Menyanthes trifoliata*. The decoction is green in colour and bitter in taste. Cases of indigestion and poverty of blood are said to be benefited by this cure, which is practised from the middle of March till the middle of April.

Yet the chief, the most effective, and by far the pleasantest cure at Meran is the climate, and especially the climate in winter. Tourists visit it in summer; invalids spend the winter here. Meran lies at an elevation of 1000 feet in the upper end of one of the widest valleys in Central Europe. It is built on the river Passer, which falls into the Adige. The valley is open towards the south; on the other sides a girdle of granitic and porphyritic mountains rises to a height of from 6000 feet to 10,000 feet. These mountains protect it from the winds which blow at higher points; when the storms rage and the rain falls round their mountain summits not a breath of air causes the leaves to rustle on the trees in Meran. Rain seldom falls in the valley, even when it is pouring on the higher slopes of the mountains. The finest weather is during the autumn and winter months. A series of observations extending over ten years shows that the yearly average of perfectly bright days—that is days when the sky is cloudless and the sun bright—is 127, and these are apportioned as follows:—48 in the months of December, January and February, 25 in the spring months, 21 in the summer and 33 in the autumn. It is rarely that the sun does not shine brightly during a few hours of every winter's day. There is least wind during the coldest months, and most rain during the hottest. A cloudless sky, warm sunshine, a dry and still air, and a equable temperature are the characteristics of a Meran winter. The health of the inhabitants testifies in favour of the climate. At several places where consumptive invalids are sent to be relieved or cured, the mortality from consumption is very large among the inhabitants. Not so in Meran. While in Vienna 66 in every 1000 are afflicted with disease of the lungs, in Meran the number is 12. The death-rate is very low. Out of a population of 5236 the average death-rate during ten years was at the rate of 23 annually, of whom a third attained the age of 60, and 5 per cent. of all who died were upwards of 80. Shrubs and trees which do not grow where the climate is ungenial flourish in the gardens of Meran; among them are the agave, the oleander and the magnolia.

Nothing that had been written about Meran as a winter place of abode produced so much effect as the fact of the Empress of Austria staying there during the winter of 1870-71, and repeating her visit the following winter. It is true that the opening of railway communication, first by the completion of the Brenner railway from Innsbruck to Botzen in 1866, and secondly by that of the branch line between Botzen and Meran in 1871, had prepared the way for visitors; yet the sojourn of the Empress was the best possible advertisement, making many persons curious to know about a place which would not otherwise have attracted their notice.

PHARMACY IN THE SEVENTEENTH CENTURY.

In the appendix to the Eleventh Report of the Historical Manuscripts' Commission, just issued, among the transcripts of the manuscripts of the Marquess Townshend, there is one, dated June 24, 1619, of a paper endorsed, "The Apothycarie's bill," Sir Roger Townshend's account, which contains the following items:—

	s.	d.
"Grene ginger"	7	0
Tabacco	2	0
Grene ginger	8	0
A masse of pills	5	0
An electuarye	3	6

Under the name of Mr. Stanhope Townshend, September 12, 1618, are—

	s.	d.
"A clyster"	3	4
A julep	3	0
A cordiall with behoardston (*sic*)	3	0
The cordiall julep	3	0
Hearbs for brothe	0	4
Rose water	0	6
A suppositorye	0	6
Another suppositorye	0	6
An unguent	0	3
A purge	3	0
Purgeing pills	2	6

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 19, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

APPRENTICESHIP IN PHARMACY.

"AND the said Master doth hereby covenant and "agree with and to the said Apprentice that he the "said Master shall and will teach and instruct or "cause to be taught and instructed his said Appren-"tice in the Art of a Chemist and Druggist which "he useth by the best means that he can." Thus, in the old world phraseology now reserved for legal documents, is expressed the main condition of apprenticeship in the agreement to which many set their hand and seal at the outset of their business career. And to the non-observance of this clause, and the difficulty of enforcing it under modern trade conditions, it is now desired to direct attention that, maybe, a remedy for some existing defects may be discovered.

Since the system of apprenticeship was instituted in England some seven hundred years have elapsed. Though it is first mentioned in the statutes of the realm in an Act of RICHARD II., passed in 1388, it is highly probable that its growth was contemporaneous with that of the trades guilds, which are known to have existed for two centuries earlier. In mediæval times the exercise of any trade was confined to those who had gained the freedom of the company of that particular trade, and the almost exclusive method of obtaining this freedom was by serving seven years as an apprentice to a member of the company. Thus it was easy to limit the number of tradesmen by prohibiting the masters from taking more than a certain number of apprentices, and an almost inevitable result of the system was the restraint of free competition. Not until the reign of GEORGE III. was the law which enacted that no person should exercise any art, mystery, or manual occupation, without having served a seven years' apprenticeship, wholly repealed, and then only because it was proved before a committee of the House of Commons that its provisions neither were, nor could be carried into effect in the then improved state of trade and manufactures.

Since that time, however, apprenticeship, though no longer legally necessary, has continued, in form at least, to be the usual method of learning a trade or art. But it is no longer what it was in the "good old days." Times have changed, old customs have decayed, and the modern indenture of apprenticeship is too often a sham. In pharmacy it is especially so. Though the youth fulfil his share of the contract, "his Master faithfully serve, his secrets keep, his lawful commands everywhere gladly do," etc., etc., he does not always receive his due equivalent as promised. Entering upon his term of pupilage with hazy notions of the requirements of his chosen profession, the clouds that obscure the path he must needs follow if he would survive are lightened by the hopes that the associations connected with the name of chemist call up. The possibility of unlimited experiments—of bangs, flashes, and stinks, innumerable—opens up a glorious vista to the mind of the youthful tyro, and he dons the apron, earnest of who knows what triumphs he may achieve, with feelings unmixed with any regret for the days of comparative freedom just past.

Alas! the awakening is not long delayed, and, in an average case, as time wears on, the ideal seems to become less and less consistent with the reality and gradually fades away into dim obscurity. The youth finds himself growing very mechanical indeed, and his hope of escaping from the dreary routine dwindles away to nothingness when the efforts he makes to effect improvement meet with no kindly or sympathetic response. At least, this is the case in sadly too many instances. Our tyro cannot well object to performing the many unpleasant duties which form the rudiments of his systematic training, but he is surely entitled to complain if these are unfairly increased, and remain his almost sole occupation during the probationary term. Shop-dusting and arranging must be learned, else the day that sees him established in business will find *his* pharmacy a dirty and untidy one. An occasional turn at sweeping out the shop or putting up shutters, when the message boy or porter has failed to return in time, need not unduly lower his dignity, whilst some experience in the delivery of messages, or even of parcels, will reckon to his credit in casting up his experience, and profit him no little. Bottle-washing, window-cleaning, packing, stock-taking, all should be cheerfully and helpfully shared in, seeing what the youth looks forward some day to being. For as a master he could not conscientiously and rightly direct those serving him, except he has at some time himself performed these various operations. Therefore such experiences should be looked upon as being well within the limits of an apprentice's duty. But a protest must be entered against the excessive imposition of these duties upon the apprentice during the whole of his three to six years of bondage. He ought not to be forcibly degenerated into an underpaid or unpaid errand boy and compelled to serve as a man-of-all-work. How shall he help hasten the progress of pharmacy if he has been trained as a menial and works like an ill-made machine? The incongruity needs to be removed, and, at the same

time, another abuse remedied. The ability to fold powders and to wrap small packages is essential, but it affords no excuse for setting an apprentice to make up seidlitz powders and packets of other popular remedies in large numbers for wholesale distribution. What is needed for home consumption is as much as there is good reason for setting him to make ready.

Having pointed out the directions in which the limits of the youth's action might with advantage be more closely circumscribed, it remains now to show what deficiencies often exist in his training. It must be the fault of the masters when both they and their pupils fail to grasp the true reason of their being as pharmacists. That their profession forms one of the members of the social body, and that they, as individual practitioners of the art, owe a distinct duty to that body, does not always seem at all clear to them. Indeed, the arguments too frequently advanced favour the idea that self-interest, rather than any sense of duty, chiefly influences them. Nevertheless, that duty exists, and, as time wears on, its reality will become more manifest. As the desire for trade gain is replaced by the impulse to conscientiously perform work from pure love of it, or from a wish to do always one's very best, so will the pharmacist's right course be more clearly shown. Every one intending to maintain existence by preparing and offering in exchange for the necessities of life, or their equivalent, any commodities whatsoever, is, in duty to his fellows, bound to guarantee their quality, and, by the mere fact of so offering them, implies their genuineness. Now it is manifestly impossible that such warranty can be honestly given if little or nothing be known of the articles in question. Hence the necessity arises of acquiring all the information about them that may be procurable. And especially does this need exist for pharmacists. Life and health are the chief possessions of human beings, and what affects these in any way is of very great importance, greater, indeed, by far, than anything else. So in the pharmacist reposes a great trust. Existence and happiness may depend upon many of the apparently petty details of his art, and it behoves him, in return for the trust reposed in him, to be ever watchful to do that which is strictly right in his profession. He should put no limit to the extent of his studies, allow no impediments to hinder him in applying the latest acquired truths in practice, and work influenced by sympathy with suffering humanity, desiring to alleviate and lessen its ills. Herein lies the distinction between the true pharmacist, who has at heart the general welfare, and the mere vendor of drugs seeking only pecuniary profit.

Having thus briefly referred to some of the defects in the system of apprenticeship as at present associated with pharmacy, we propose on an early occasion to indicate some of the directions in which, in our opinion, there is a possibility of amending them.

We are glad to be able to say that on Thursday evening the Conversazione of the Chemists' Assistants' Association was carried out with the greatest success in the Portman Rooms. A very numerous company was present, including the President of the Pharmaceutical Society and Mrs. Carteighe, the Treasurer, the Secretary, and other influential members. The earlier part of the evening was occupied by a Concert, in which the Association had the advantage of the services of Miss Maud Martin and Miss Annie White, as well as several gentlemen, and the concert was followed, as usual, by dancing. In addition there was an exhibition of microscopes, lent by Messrs. Beck and Darton and Co., the former firm showing also a fine series of bacilli displayed under high powers. Great credit is due to Mr. A. J. Phillips and the other members of the Committee who had charge of the arrangements.

* * *

According to some statistics published in the *Overland Ceylon Observer* the exports of cinchona bark from Ceylon between October 1, 1886, and September 30, 1887, amounted to 14,389,184 lbs., of which 12,944,070 lbs. came to this country. The next best customer, but at a long interval, was America (? United States), for 592,087 lbs., after which came Rotterdam and Amsterdam for 333,514 lbs. Other exports from the island during the same period were cinnamon, bales, 1,793,893 lbs., chips, 505,591 lbs.; citronella oil, 8,371,426 ozs.; cinnamon oil, 62,668 ozs.; coffee, 180,429 cwts.; tea, 12,013,686 lbs.; and cocoa, 16,638 cwts.

* * *

Messrs. Burroughs and Wellcome write requesting us to make known that they will be happy to present specimens of the genuine strophanthus pods to materia medica museums.

* * *

A meeting of the Midland Counties Chemists' Association will be held at the Grand Hotel, Colmore Row, Birmingham, on Thursday evening, the 24th instant, when the following papers will be read:—(1) "A New Form of Percolator" by the President; (2) "Note on Methylated Ether," by F. H. Alcock; (3) "Remarks on Dentifrices," by W. T. Elliott. Professor Tilden has also kindly promised to send details as to a few interesting experiments. The chair will be taken at half-past eight p.m., and members and associates are invited to bring forward notes on subjects of pharmaceutical interest, and to take part in the discussion.

* * *

A meeting of the School of Pharmacy Students' Association will be held on Thursday, November 24, when a paper will be read by Mr. E. J. Woolley on "The Estimation of Arsenic by Iodine Solution," and a Report on Botany and Materia Medica will be made by Mr. E. White.

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The next meeting of the Chemists' Assistants' Association will be held on Thursday, the 24th inst., at 103, Great Russell Street, W.C., when short papers by members will be given.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifteenth general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, the 10th inst., the President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meetings were read and confirmed, and several donations of periodicals announced.

Messrs. C. H. Walker, R. H. Jones, A. H. Ellithorne, J. Girvan, J. Flint, T. F. Yeats, G. R. Sleggs, George Alexander, John Alexander, G. Sant, H. Wyatt, A. Stewart and W. T. Warhurst were elected members.

Mr. Edward Davis, on behalf of Messrs. Ayrton and Saunders, drew attention to some new *papier maché* funnels said to be acid proof. Mr. Davies said he had tried them with sulphuric acid 1–4, with strong hydrochloric acid, and also with nitric acid, both strong and diluted, and that they were unaffected by any of these. Mr. Davies also exhibited some new filtering papers having threads interwoven, by which means they were made very tough, and would support a great weight.

Mr. B. Dickens asked how long a solution of hydrofluoric acid, half per cent., may be kept in ordinary glass bottles and be considered of reliable strength.

The President, in reply, said that he had experimented with this solution, and had found that it might be kept for a considerable time in green flint glass bottles, but not so long in the ordinary white glass bottles.

Mr. Wyatt, jun., suggested that it be kept in a corked bottle, the cork having been protected with paraffin.

The Hon. Secretary read a note from Mr. J. J. B. Woods, saying that he had had a prescription to dispense consisting of lin. potassii iodid. c. sapone and morphinæ oleas 5 per cent., and had found that on mixing them a curdling took place, and the mixture rapidly separated into a thick froth and a watery portion. He had tested the ingredients and found them correct, and would be glad to have the opinion of the meeting upon the subject.

Mr. Dutton said he had frequently found it difficult to mix other substances with lin. potassii iodid. c. sapone, and that it was apt to separate even on rubbing alone.

Mr. Wyatt, jun., thought the separation was due to the incompatibility of free oleic acid with the liniment.

A vote of thanks to Mr. Woods for his communication was proposed by Mr. J. S. Ward, seconded by Mr. Conroy, and unanimously accorded.

The Hon. Secretary then read the following paper in the absence of the author :—

Note on Trade Samples of Citrate of Iron and Ammonium.

BY F. A. BROWN.

Some time ago I had occasion to make a number of experiments photographically, in which citrate of iron and ammonium was the principal article used, that is, the results depended mostly on this preparation. It is used in combination with ferridcyanide of potassium ($K_6Fe_2Cy_{12}$). A definite quantity of each are dissolved in a definite quantity of distilled water, and the solutions mixed; a piece of drawing paper is then sponged over with the mixture, and put in a dark place to dry. When dry the paper is placed in a printing frame over a negative made by tracing with Indian ink on tracing cloth. After being exposed to the light for eight or ten minutes the print is taken out of the frame and well washed in cold water and hung up to dry. If a successful print has been obtained, that part covered during exposure by the Indian ink tracings should wash out perfectly white, and the other portion should be of a dark blue colour. Out of about eight samples, all obtained from different wholesale houses of repute, there were not two which gave results nearly alike. Assuming that the subject had not previously been brought before your notice, I thought it would form a subject for a paper which would be of interest. For this purpose I obtained a number of samples from well known and what are considered first class wholesale houses, each sample, according to label, I take to be prepared according to the direction given in the latest edition of the B.P., and I think I shall be right in saying that some are not prepared according to that authority.

Among the characters and tests given in the B.P. is one that it should be in thin transparent scales of a deep red colour. Samples number 1 and 6 are decidedly of a black colour, the others are all of a deep red colour; number 4 is more characteristic in this respect than any of the others. The amount of ferric oxide (Fe_2O_3) each sample gave when incinerated with exposure to air is as follows:—

No. 1 gave	38·3	per cent.
„ 2 „	30	„
„ 3 „	30	„
„ 4 „	30	„
„ 5 „	30	„
„ 6 „	43·3	„
„ 7 „	33·3	„

Four out of the seven samples yielded the correct percentage of Fe_2O_3.

This photographic process is very much used in large mechanical works for photographing the drawings to send in the works, thereby saving an amount of time and labour, as any number can be prepared from one tracing, as previously stated; what is wanted is a reliable preparation that will give a deep blue colour and clear white lines. You will notice that both these properties are not given to any great extent on any one of the photos that I have laid before you. As to why there should be such a marked difference in the results, and using in each case what I expected to be a B.P. preparation, at present I am not able to say with certainty, as having only a limited amount of time at my disposal I have not been able to complete my experiments.

The President said that he had made some experiments in the direction of those of Mr. Brown and had met with similar results; he was not, however, in a position to say what was the cause of such discrepancies.

Messrs. Dutton, Wyatt and Conroy were of opinion that the principal factor in the varying results was the want of uniformity in the alkalinity or otherwise in the several samples.

Mr. J. S. Ward said he thought two or three causes might be suggested, 1st, the varying alkalinity; 2nd, the probable presence of tartaric acid; 3rd, the possibility of the presence of fixed alkalies, and 4th, that there might possibly be ferrous iron in some of the samples.

A very hearty vote of thanks, proposed by Mr. Conroy, seconded by Mr. Parkinson, and supported by the President, was accorded to Mr. Brown for his paper, and the meeting terminated, the President announcing that at the next meeting Mr. J. S. Ward would read a paper on "Tinctura Cinchonæ."

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The first ordinary monthly meeting was held in the rooms of the Chemical Club, at the Grand Hotel, November 9, Mr. F. Baden Benger (Vice-President) in the chair.

The minutes of the previous meeting having been read and confirmed, the Chairman brought forward for discussion the advisability of providing a permanent habitation for the library, as central as possible, and a place which would serve for the holding of the meetings of the Association. The Chairman was deputed to see Mr. Bell with regard to the library being located in the room in which they were then assembled.

Members were invited to send in to the Secretary a list of any books they desired to be purchased and added to the library.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the tenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, November 9, at 9.15 p.m., Mr. George Lunan, President, in the chair.

The minutes of last meeting having been read and approved the Secretary read the report of the Committee on the Association Prizes Competition. Nine candidates had entered, of whom eight presented themselves for examination, and the result was found to be as follows :— First prize (value £2 2*s.*), Mr. J. T. Grant, 17, North Bridge, with 91 per cent. of marks ; second prize (value 12*s.* 6*d.*), Mr. John Findlay, 35, Forest Road, with 74 per cent. of marks ; third prize (value 7*s.* 6*d.*), Mr. Thomas Couley, 36, Howe Street, with 70 per cent. of marks. The prizes were then presented to the successful candidates by the President, who congratulated them on the positions they had attained, and expressed a hope that those who had been unsuccessful on this occasion would persevere and try again, and that many more would take advantage of the opportunities afforded by these prize competitions, which he regarded as one of the most valuable features of the Association's work.

The remainder of the evening was devoted to the reading and discussion of notes arranged by Mr. William Duncan. The first was a—

Preliminary Note on Tincture of Quillaia Saponaria.

BY PETER BOA.

Having had some experience in the use of quillaia bark for other than strictly medicinal purposes, I had long ago come to the conclusion that an aqueous menstruum was the most suitable for extracting its active constituents. I was therefore somewhat surprised to find that the formula given by the British Pharmaceutical Conference Committee directed the tincture to be made with rectified spirit. It is true that no dose is specified, and as the tincture for which the formula is given is used in the preparation of liquor picis carbonis we may reasonably assume that this was the sole object for which the tincture was designed, and if this be so we can scarcely find fault with it, because for the purpose in question a rectified spirit tincture would be preferable to one less strong in alcohol. However, there is an increasing demand for tincture of quillaia for internal use ; in Edinburgh this has been markedly so since the beginning of this year, when Dr. Claud Muirhead, in the *Edinburgh Medical Journal*, referred in commendatory terms to the administration of the drug in bronchitis, and there is just a possibility that the B.P.C. formula may be taken as a guide to the preparation of a tincture for this purpose. It would, I think, be a pity if it were so taken, because this tincture does not at all represent the virtues of the bark. I have looked up a number of references to quillaia, and I find that all the writers on the subject agree in the conclusion that water is the best solvent of saponin, which is regarded as the active principle of the bark. Gmelin says that saponin is easily soluble in water (1 in 4), more soluble in dilute than strong alcohol, insoluble in absolute alcohol.

Häger gives a formula for an infusion, and a tincture prepared with dilute alcohol.

Grazer, an American pharmacist, recommends for emulsifying purposes a tincture with 3 parts of water and 8 of rectified spirit.

Dr. Claud Muirhead has used with success a decoction.

Collier gives a formula (*Pharm. Journ.*, Sep. 20, 79) for emulsifying purposes with 4 ozs. of bark to a pint of rectified spirit ; this apparently is the formula copied into the B.P.C. formulary, but made with only half the quantity of bark.

For the purposes of this note I have prepared tinctures of various alcoholic strengths. I take three of these for comparison :—

No. 1 is made according to the B.P.C. formula.

No. 2 is made with proof spirit.

No. 3 is made with 3 of rectified spirit and 4 of water.

The time at my disposal since agreeing to bring the subject before this meeting has not been sufficient to enable me to estimate the comparative values of these tinctures except in a somewhat rough and ready way, although I believe the results may be taken to be fairly trustworthy. The quantity of saponin in a tincture may be estimated comparatively by the amount of froth which it produces when shaken up with a quantity of water. Taking the three tinctures above mentioned, adding ½ a drachm of each to 2 ozs. of water in a 6 oz. bottle, and shaking, the following results were observed :—

No. 1 gave of froth 1.
No. 2 „ „ 1¾.
No. 3 „ „ 2.

A percolate obtained by running a quantity of water, equal to half the quantity of the original tincture, through the marc from the B.P.C. formula, gave nearly as good results as No. 3, showing that the bark had not been exhausted by any means ; a percolate obtained in the same way from the proof spirit tincture residue gave very little indication of value. I may say that preliminary mixtures with the water were made with spirit added to Nos. 2 and 3 to make them equal in alcoholic strength to No. 1, in case the spirit might affect the froth test. It was not found to affect the results and has not been added to the specimens shown to illustrate the comparative frothing power. An emulsion made with No. 1 and a fixed oil separated more quickly than one prepared with No. 3. I hope, if time will permit, to determine more accurately the comparative values of these tinctures. However, I have no hesitation in concluding from the result of my experiments that a weak alcohol is preferable to a strong for making tincture of quillaia. In fact I see no use for any alcohol except for preservative purposes.

The question arises : What should be the strength of the tincture ? Dr. Muirhead says he gave ℥ss to ℥j of tincture, but, unfortunately, he says nothing about the strength. He mentions, however, that the decoction of which he gave a tablespoonful was made with 5 of bark and 200 of water. A tincture of equivalent strength might therefore be made with 2 ozs. to a pint. To make the tincture approximate in strength to senega tincture, 1 oz. to the pint would be more than enough.

There is just one point more to which I would allude. The B.P.C. formulary does not specify the part of quillaia bark to be used. Undoubtedly the white portion of the bark is the more valuable ; the brown outer portion contains chiefly colouring matter. Both, however, are used together, for I have seen commercial specimens of tincture resembling in colour tincture of orange peel. The specimens shown, made from the white portion, are, at most, pale straw colour. In making liquor picis carbonis colour is of no consequence, and the quantity of bark ordered is greatly in excess of what the menstruum can exhaust, hence, presumably, the want of any specification on this point.

Mr. John Sharp then gave a most interesting description of the anatomy and life history of the common leech, illustrating his subject by a number of coloured diagrams and freshly prepared dissections.

The next communication was a—

Note on Hydrobromic Acid.

BY JOHN WILSON.

Some time ago my attention was drawn to some hydrobromic acid which had recently been received into stock, and which showed evident signs of decomposition.

A faint straw colour was first observed, which gradually deepened, until it was an intense yellow.

A few preliminary tests showed abundance of free

bromine, and the question became, "What is the cause of this unwelcome change?"

To answer this satisfactorily it was necessary to know by which of the many different processes the solution had been made. It was labelled B.P., 1885, indicating that it had been prepared by decomposing sulphuretted hydrogen by means of bromine, distilling the hydrobromic acid formed, and making the distillate up to a specific gravity of 1·077 and a strength of 10 per cent. The reaction which takes place is as follows:—

$$10\,Br_2 + 4\,H_2S + 8\,H_2O = 20\,HBr + 2\,H_2SO_4 + S_2.$$

The solution is apt to be contaminated with free sulphuric acid if the distillation is carried too far, and it proved to be the case in this instance, for on the addition of a little barium chloride solution the white insoluble barium sulphate was formed.

At first it was thought that there must be other acids present to account for the decomposition, but no trace of either bromic, hydrochloric or phosphoric acid was found after careful testing.

Light exercises a strong influence on hydrobromic acid, but in this instance it could not have been the disturbing agent, as the bottle was entirely excluded from direct sunlight or even bright diffused daylight. The action of sulphuric acid is something as follows:—

$$2\,HBr + H_2SO_4 = Br_2 + 2\,H_2O + SO_2.$$

Sulphurous acid was specially looked for, but without success, so probably it was oxidized into sulphuric acid again, in presence of water and oxygen.

$$2\,SO_2 + 2\,H_2O + O_2 = 2\,H_2SO_4.$$

Oxygen is a potent agent in liberating bromine from its compounds, and in this case it no doubt supplemented the action of the sulphuric acid, as the bottles when first noticed, were little more than three-fourths full, thus allowing space for a fair proportion of air.

In the *Pharmaceutical Journal* of October 29, some interesting experiments of Dr. Richardson are noticed regarding the action of light and oxygen on some haloid compounds. When hydrobromic acid was exposed to direct sunlight with a small proportion of oxygen, and in the presence of aqueous vapour, only ·06 per cent of free bromine was liberated after forty-six days, but with excess of oxygen under similar conditions, 7·6 per cent. of bromine was liberated after forty-five days. No decomposition was observed when the dry gases were exposed.

With this sample there was, as I have said, no exposure to light, nor undue excess of oxygen, so I am inclined to believe that the sulphuric acid was the principal decomposing agent.

I may also mention that the specific gravity of the solution is 1·085—rather higher than the B.P. standard. This of itself would indicate either excess of hydrobromic acid, or the presence of some impurity.

I regret that I have had no opportunity of estimating the percentage of free or combined bromine in the liquid. The results would no doubt be of interest, and might throw some further light on the subject.

The last communication was a—

Note on a Mixture of Glycerine and Mucilage of Acacia.

BY WM. DUNCAN.

Two weeks ago a member of our Association drew my attention to the fact, that when glycerine is added to mucilage a jelly is formed, and asked if I could explain it. He is in the habit of using this mixture as an excipient for Blaud's pills, and had noticed that if it be allowed to stand for any time before using, the mixture thickens, a sort of jelly-like body being formed at the junction of the two liquids.

Thinking that glycerine might be a precipitant of arabin, I at once jumped to the conclusion that this was the explanation of the formation of the jelly, but on stirring together equal bulks of the two liquids in a glass measure, no separation of arabin took place. On the contrary, the mixture remained quite bright and fluid. This agrees with the statement in 'Pharmacographia,' "that mucilage mixes with glycerine and that the mixture may be evaporated to a jelly without any separation." I found, however, that if the glycerine be first measured out, and the mucilage be then run on to the surface of it, care being taken not to mix the two liquids, in about five minutes a jelly is formed at the junction of the two, which slowly falls to the bottom if the measure be allowed to remain undisturbed for a couple of hours. The jelly, after being slightly washed to rid it of adhering glycerine, was found to be readily soluble in water, and the solution gave precipitates with basic acetate of lead, alcohol and ammonium oxalate, so that probably it is simply gum arabic. If the mixture be stirred, the jelly becomes re-dissolved and a clear solution results. This leads me to the following explanation of the reaction:—The glycerine absorbs part of the water from the mucilage, and the gum not having sufficient to keep it in solution is precipitated in the form of a jelly. After a time, however, if the mixture be shaken, the glycerine and water begin to dissolve the precipitated gum, and we have then a clear solution. I believe this explanation to be the correct one, as I find that if glycerine be first diluted with 25 per cent. water no separation takes place on the addition of the mucilage.

The reading of the papers was followed by an interesting discussion, in which a large number of members joined, and the contributors received a hearty vote of thanks.

The Chairman having intimated the next meeting for November 23, when a paper on "Practical Pharmacy" will be read by Mr. James Mackenzie, the meeting was closed.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The first monthly meeting of the present session of the Sheffield Pharmaceutical and Chemical Society was held on the evening of Wednesday, November 9th, Mr. J. M. Furness, President, in the chair.

The following gentlemen were elected associates:—Messrs. Fallding, jun., Exell, Chatterton, Winn, Hampshire, Hooley, Hambley, W. H. Smith, Ruff, Golland, Gregory, Steer.

The secretaries announced the donations of several journals, and of a set of British Association Reports from Mr. Furness.

A lecture was then delivered by Mr. J. H. Worall, F.C.S., on "The Periodic Law applied to the Study of Chemistry." The lecture, which was illustrated with well executed diagrams, was much appreciated, and will be published in an early number of the Journal. A short discussion ensued, which was taken part in by the Chairman and Messrs. Ellinor, Chattaway, Humphrey and Grierson.

It was announced that the next meeting would be held on November 30, when a debate would be conducted on the subject, "Is Free Trade in Drugs Desirable?"

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the new session was held on Thursday, November 10, Professor Attfield, F.R.S., President, in the chair.

The minutes of the previous meeting having been read, Messrs. A. Chaston and J. H. Cuff were appointed scrutineers, and proceeded to examine the voting papers for the election of the officers. The result of the election

was as follows :—Vice-Presidents, Messrs. F. C. J. Bird and E. J. Eastes ; Secretary and Treasurer, Mr. F. W. Short ; Assistant Secretary, Mr. E. White ; Executive Committee, Messrs. A. Mander, W. A. Salter, J. E. Southall, and G. Whitfield.

The following introductory address was then delivered by Mr. G. F. Schacht.

Inaugural Address.

He would be a very clever person indeed who would be able, within the limitations imposed upon me to-night, to enlist an equal amount of sympathy in the breast of each man who now listens to me. To effect such a result, he would have to know each one personally, and to address each one in accordance with that knowledge.

As the full amount of my acquaintance with you consists in this—that you are students in our School of Pharmacy, about to commence a course of scientific study—I must do my best to construct an ideal "average student," and address my observations to the abstraction thus created, a course not quite favourable, I fear, to the production of any deep personal impression, but, as it appears to me, the only one that is available.

I shall imagine, then, my "average man" to be one whose aspirations for the position he has now adopted, have hitherto had no proper opportunity for their fulfilment, and for whom consequently a new page of life is now unfolding. I shall imagine that his aspirations are somewhat vague, that he anticipates a good long semi-holiday, agreeably diversified with reading and experimenting, with perhaps the "discount" of a "beastly exam." (I think that is the proper phrase) at the end. I shall imagine, however, that although a good deal of pleasurable indulgence may find place in these anticipations there will also exist an honest hope for growth in knowledge and character, and for advance towards the dignity of a man of science. And to this dim outline of my "average student" I address myself—or rather to a class of such imaginary beings.

The natural course of the early life of a man of science might probably with some propriety be thus arranged.

We must assume that his training, mental and moral, has been such as to present him with an equipment of those powers, by the exercise of which he is to pursue his future career. This I am aware is a very important assumption, upon which indeed very much might be said, but I pass it hastily at the present moment, because perhaps his parents, rather than the young man himself, are responsible for this preliminary preparation.

Assuming then a fair possession of the necessary mental and moral capabilities, he will commence his professional work by the gradual and systematic acquisition of the knowledge of facts that has been accumulated by the labours of others, and of the generalizations concerning those facts which their wisdom has suggested.

He will also familiarize himself with their methods of work, both with head and hand. During this portion of his career all the powers of the student will be proportionately exercised and strengthened, that is, if he is being judiciously trained, and he will become more or less skilful, learned and wise.

I have predicated that our typical student has been equally well prepared morally as mentally ; and one effect of this should be the possession of a modesty that should prompt him to receive with respect the experience of his elders (which in many cases will be the experience of the whole known world of previous being), and another effect of which should be the development of an ambition, and a bold resolve to add something by his own work to the great store of knowledge.

Furthermore I think one other obligation rests upon the true man of science ; namely, that at the proper period of his life he makes effort to distribute to others the results of his knowledge, and to kindle amongst them the flame of his own spirit.

Now I have been addressing you but a few minutes :—I wonder if, as far as I have gone, I have your approval and sympathy. If I have, then I think I may regard you as having, at any rate, commenced your work in the spirit of true men of science, and in that spirit I shall endeavour to continue my few remarks.

We are agreed then that the first part of your work must consist of an endeavour to master with more or less completeness the results of your predecessors' labours. This you will soon find is no semi-holiday work, but on the contrary, that whatever field of knowledge you attack the task of capture will appear to become more and more serious the further it is penetrated. It is even possible that to some, when for the first time the greatness of the work commenced comes to be realized, a sense of bewilderment, if not of despair, may seize upon you and tempt you strongly to retreat.

I have known such cases, and have sought for their explanation. In most of them I have found it to be that the first advance has been too rapid—a frequent cause of panic in other scenes than those we are now considering. Exuberant desire has called for more than could be properly appropriated, and perplexity has usurped the place of order. I venture this remark. The judgment of the trained teacher is the only reliable means known to me both for the prevention of disaster in the first case, and for subsequent restoration. I exhort you, therefore, to be careful to seek for this judgment early, and to be guided by it throughout. I know something of the men you will have to turn to, and I believe you may fully trust them. Estimating them as I do, I should not be surprised to find that they limit your operations for longer than you quite like to the drudgery of drill, and, so to speak, delay your advance to the intricacies of cube root until you really know the multiplication table. But do not let this disgust you. Try and remember that all good education aims at the progressive cultivation of the powers of the individual, who must toddle before he can walk, and walk before he can run.

I therefore venture to urge you all to do your part towards the cultivation of an attitude of full confidence with your professor, and you will then work hopefully together, the one supplying the pabulum in due proportion to the other's wants, or, in due time, directing him where and how to help himself.

The arrival of this important epoch in any student's career is a nice point for the teacher to detect, I mean the time when he may be advised to commence his grapple with the Unknown, and to question Nature for himself.

I am sure this may be attempted too soon, and yet it would be sad if delayed until he had lost any portion of his enthusiasm, and, so to speak, "had got to have no pleasure in them." Original research is no doubt one of the main purposes of your Association, and, as I have already said, I consider it one of the distinct duties imposed upon capable men of science ; but it is so noble an aspiration, and has a sound so full of fascination, that it is apt to beguile the immature from his course of solid, steady growth before he has attained the capabilities requisite for the work.

The assumption of abilities that are not really possessed is apt to be termed conceit ; and though there may be less offensive explanations for many a young man's conduct in too hastily assuming the *rôle* of his elders, it is certainly wiser to attempt nothing of the importance implied in the word "original research," unless someone other than ourselves can assure us of our due competency. Imperfect work and over-hasty conclusions are harmful instead of useful to the cause of science, and not only delay the advance of truth herself, but tend to demoralize her would-be disciple.

It is because I know something of the perils of this period of your probable career that I have said so much that to some may appear mere platitudes upon the necessity of gradual and systematic training. Experience generally reveals to us, some time or other, our own mis-

takes. I once occupied the very position many of you occupy to-day, and I am quite sure now that I should have become an abler and more useful man had I adopted the prudent course I am urging upon you. I was a little too eager, and missed the full benefit of the training which I then fancied to be superfluous. I know now how useful that training would have been.

But do not, I pray, for one moment misunderstand me. I should be sorry indeed to play the part of wet-blanket, and to damp or extinguish the ardour of any man's quest for the highest. I hope I reverence it too well for that. Only let it be clear that the proper moment has arrived, that a real conviction exists of full qualification for original work, then I invite you earnestly to obey the impulse and vigorously to attack one or other of the dark problems that surround you.

The assured possession of such a power is worth all your previous training—its exercise is one continued great reward—a perpetual effort sure of perpetual recompense—a constant gratification of an ambition that need never be sated—the conscious command of a field that has absolutely no limit.

Shall I dare to give you a glimpse of its extent?

The chemist may in these latter days be said to have claimed the whole material universe for his scientific battle-ground.

We, who call ourselves pharmaceutical chemists, may perhaps wisely prefer to limit the sphere of our operations to the matter that lies closely about us; at any rate we may be content to clear such ground of any existing entanglements before we attempt, let us say, to solve the secrets of the fixed stars.

Well, pharmacy is an integral portion of the art of medicine. What have the most illustrious professors of that art to say about their great calling? Are they perfectly satisfied with its scientific aspect? Do they tell us that their practice is the outcome of real knowledge, and that their teaching is clearly on the lines of pure truth?

From time to time in recent years I have heard many discourses delivered by some of the most eminent men in the profession. In almost every case the speaker has had to admit how largely empiricism pervades professional practice, and has declared how earnest is the hope that the joint achievements of the chemist, the physiologist, and the pharmacologist, may before long justify some attempt to construct a real science of medicine. At present enough is not known.

Amongst the most recent utterances of this kind is one to which I should like to draw special attention.

It took the form of a paper which was read at the meeting of the Pharmaceutical Conference at Manchester, and was delivered by Dr. Leech, the Professor of Pharmacology in the Manchester School of Medicine, and it was entitled "The Future of Pharmacy."

The author assured us as the result of personal and general conviction, that the advance toward the practice of scientific medicine was and would continue to be in the direction of the employment of "definite remedies," in "very exact" doses; that this was due to fuller study nowadays than in times gone by, of the action of drugs upon the organs and tissue of animals, and upon the processes of life; that these studies were being pursued vigorously, and that the physician was only waiting for more light from the chemist, the pharmacologist and the physiologist, to build up upon a real scientific basis a sound theory of medicine. We have heard, as I have said, a good deal of this before, but much of the interest of this paper to us who listened to it consisted in the clearness with which the author indicated the part we pharmaceutical chemists have to fulfil in the matter. It is no less than this:—We are to discover, separate, and prepare in absolute purity, and offer for the use of the physician, in exact doses, every element and every organic principle, and every form of their combinations. In support of the necessity for this demand, Dr. Leech exhibited a beautiful experiment which showed the marked physiological effect upon an animal organism produced by the introduction into the water surrounding it of $\frac{1}{30000}$ part of a certain vegetable principle, veratria.

Let me repeat, it is our duty to prepare for the use of the experimenter every element and organic principle, and every one of their combinations in a state of absolute purity and in reliably exact doses.

The task thus set before us covers, even at first sight, a large field, but reflection shows it to be very large indeed, and fairly to justify the expression I have just used "without limit." For I would point out first that almost all past work will have to be examined and revised.

The doctor exhibited with some satisfaction a set of curves calculated to show the gradation of the effect produced by varying quantities of the alkaloid.

But who shall say that any one point in his curves is correct. Was the veratria he employed pure? I know of no process for determining its purity, and indeed I doubt if it has ever been seen pure. At any rate the British Pharmacopœia describes it as "an *alkaloid* or *mixture* of alkaloids obtained from cevadilla, not quite pure." This consideration does not render Dr. Leech's experiments one particle less interesting, or release us to any extent from the obligation to furnish him and others with absolutely pure veratria as soon as we can; but it serves to show the large amount of preliminary work that must be done in the highest possible manner, by well qualified chemists, before the pharmacologist can with any confidence record a single result. He cannot escape from the inherent difficulties that surround his position except by complying with the conditions he has himself laid down. Unless he employs an absolutely pure material, his experiment fails to tell him what an absolutely pure material will do. A respectable guess might undoubtedly be made—but so it might by employing the crude drug, as was the custom in the days of Sydenham, of whom the modern pharmacologist appears to wish to hear no more. What he demands is "exact doses" of "definite chemical substances" of "absolute purity," at any rate, that shall not contain $\frac{1}{3000}$ part of any other unknown thing; and for the purposes of his scientific studies the demand is perfectly legitimate.

Let me remind you of a little more. You all know the drug nux vomica, and that it contains (or that from it may be obtained) *inter alia* two substances, strychnia and brucia. Rather vague ideas are at the present time entertained about the relative potencies of these two substances, and of the modifying powers of the one over the effects of the other. What a glorious theme for the experimental therapeutist. Give him an ounce or two of these substances *pure*, and a free hand to employ them upon a score or two of vile bodies, and what light might he not shed upon this scientifically interesting matter. But something stands in the way. We cannot get an ounce or two of pure brucia. Perhaps you could not buy a grain or two for many times their weight in gold. It is probable no one, or but very few, have ever yet seen the article.

Have we not much the same story to tell of the alkaloids generally? What shall we say about quinine? without doubt the most extensively used alkaloid that medicine possesses. I am afraid we must say that not a single grain of *pure* quinine sulphate has ever yet been administered. For years after its first introduction into medical practice it was largely contaminated with other of the bark alkaloids, not from any intention to defraud, but from imperfect knowledge of their existence and characters, and even now, notwithstanding the large amount of labour that has been devoted to the subject, the difficulty of separating the last portions of those contaminations appears to triumph. And so the Pharmacopœia has to say: "Sulphate of quinine should not contain much more than 5 per cent. of sulphates of other cinchona alkaloids." Five per cent. is $\frac{1}{20}$th of a part, not $\frac{1}{3000}$th!

It is clear then that much of the work of the past must

be examined and, if necessary, rectified before that of the pharmacologist can be satisfactorily commenced.

I turn to another portion of Dr. Leech's paper.

"One of the leading features of the therapeutics of the present day is the introduction of organic compounds of definite composition as medicines. These compounds are the outcome of conjoint chemical and pharmacological investigations. By putting an atom of amidogen into this compound, or an atom of ethyl into that, it is possible, as Schmiedeberg and others have shown, to build up substances whose physiological and therapeutic action can be foreseen. Already we have dimethyloxychinizin (antipyrin), tetrahydroparachinanisol (thallin), oxychinolinemethylhydride (kairin), dimethylæthylcarbinol (hydrate of amylene), and many others. Doubtless, too, we shall have many more."

If we accept this statement as correct (and I have neither right nor desire to doubt it), we must admit that it points to a new and very important extension of our materia medica, and a proportionate development of our field of enquiry.

And I quote one more passage from the same address :—

"Empiricism, guided increasingly, however, by pharmacological knowledge, will long continue to govern our therapeutic procedures, and the time-honoured infusions and decoctions will not yet awhile be replaced by active principles, for the combinations formed by nature in plants are often better than any single substance which we at present know or any artificial mixture of these substances."

Frankly I think there is as much wisdom in this sentence as in any contained in the paper, though I admit its wisdom can only be proved by the experience gained by the investigations already suggested. I cannot help thinking, however, in the meantime, that it is not merely for the sake of torturing our powers of analysis that Nature so very seldom offers anything *pure*. I know of no vegetable principle that occurs naturally in a state of isolation, and in the *in*-organic world there are but very few of the elements that are found in their elemental condition.

On the other hand it is very frequently observed that the purer chemical substances are the less inclined they are to interact, and we also frequently see that the mere presence of an accessory or foreign body will bring about a combination which but for that presence would not take place.

It is at least possible, therefore, that after having thoroughly tried the exhibition of definite and absolutely pure remedies the physician may, as the result of scientific reasoning, return to the employment of some of the impure ones—that is, as offered us by Nature.

Conjecture, however, cannot solve these questions—long and patient experience may. In the meantime I urge you not to abandon the practice of your old familiar set of duties, but rather maintain a complete familiarity with infusion, maceration, pressure, and all other time-honoured processes, whose aim should ever be to present the potentialities of the drug as nearly as possible in the state offered us by Nature.

So you see that what with the re-examination of the past, the conservation and development of the technical processes of the present, the isolation and examination of principles still unknown, and the realization of the anticipations of the scientific creators of utterly new bodies, we pharmacists can really claim for our own special original work a very extensive field.

Lest in pointing out the difficulties that attend the task imposed upon us, I may have appeared to overcriticize the paper from which I have quoted, let me say I have had no such intent whatever. I estimate it highly, and consider that pharmacists generally owe its author, Dr. Leech, a distinct debt of gratitude. He has indicated clearly what he considers to be the course of medical progress in the future and has told us plainly what he thinks we ought to do that we may hold our proper place in its forward march. We must, without doubt, accompany it, and if we would avoid disgrace we must fulfil the duties of our position. It is manifest that the enormous amount of verification work and original work proper cannot be relegated to our hands alone, but we clearly ought to do our part. I think that as a body we are becoming more and more alive to a sense of this duty, at any rate, that an increasing number amongst us would like to assist in it.

I must forbear, of course, to dilate upon anything that touches the domain of pharmaceutical politics, but I may perhaps with propriety remind you of the long continued efforts of the Council of the Pharmaceutical Society to advance the standard of professional education, and (of late) to provide better opportunities for pharmaceutical research. I hope before long these may be so far developed that we may be able to invite members of the other section of the medical art to co-operate with us in some definite scheme of practical work, under conditions that shall carry with all its results the stamp of conviction and authority.

In these labours you of the young generation are the men specially indicated to assist. Again I say, equip yourselves well for the work, and then enter in upon your reward.

On the conclusion of the address a vote of thanks to Mr. Schacht was proposed by Professor Green, who laid stress on several points which struck him as being very important, especially as regards the purity of various substances, and how it is to be known when they are pure. He also spoke of the fascination exercised by scientific pursuits over those who had once passed the drudgery inseparable from the commencement of their study.

The proposal was seconded by Mr. E. G. Baker, and after some remarks by the Chairman was carried with great acclamation.

A vote of thanks to the President for his continued services, proposed by Mr. Bird, and seconded by Mr. Eastes, was also passed, and the meeting adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, November 10, Mr. T. S. Dymond, President, in the chair.

After the reading of the minutes and their confirmation, the President called upon Mr. A. W. Gerrard to read his paper upon—

Emulsions.

BY A. W. GERRARD, F.C.S.,

Teacher of Pharmacy to University College.

When in reply to the request of your President to read your Association a paper, I decided to choose emulsions for a subject, my mind was influenced by the feeling that it would be a branch of pharmacy in which all of us took considerable interest, and to which many in the course of discussion could add some fact of practical value gathered from practical experience.

Twenty-five years ago, in the early days of my pupilage, I can well remember the rough and ready rule of thumb methods that often prevailed when an emulsion had to be made, also the thick gruel-like magmas or thin greasy stuff produced. Happily there has been a change for the better, and pharmacists now recognize that to make satisfactory emulsions certain rules must be observed as to quantities and careful attention given to the process.

The most generally useful and important emulsifying agents at our disposal are the gums of acacia and tragacanth, used either as powder or mucilage, preferably I think as powder ; of less value, but still having some special qualities to recommend them, should be mentioned yolk of egg and the tinctures of quillaia and

senega. Milk is an emulsion formed by nature, and closely allied to milk in character is the emulsion made by rubbing almonds with water; both of these, though providing the highest types of what emulsions should be, are certainly not good emulsifying agents, for they possess no more power to emulsify than does a well-made diluted emulsion of any fixed oil. It is the habit of some dispensers to speak of the solutions of potash, soda and ammonia as emulsifying agents. The cases are very few indeed where they really act as such; for when we combine alkalies with an oil or resin, they form soaps or semisoaps, so that their action is chemical, whereas a true emulsion owes its condition to physical influences. The alkalies have, however, some small power to emulsify, for I have often noticed that when they are shaken with chloroform or ether in the presence of vegetable extractive an emulsion has formed; its character, however, is weak, as separation usually takes place in twenty-four hours.

There are a few remarkable examples of emulsification happening daily in pharmaceutical practice, to which hitherto little or no attention has been paid, although it seems almost impossible they can have been overlooked. Most dispensers, when making an ointment with vaseline, must have observed the change of colour the vaseline undergoes, and how opaque it becomes on stirring; the explanation of this is, that an emulsion of air has been formed. The peculiar viscosity of the vaseline and the motion of the spatula causes imprisonment of air, which soon becomes distributed in an extremely fine state of division. The statement here made is easy to prove, and can be demonstrated by the following experiment:—Dilute some spirit of wine with water until a piece of vaseline just sinks in the liquid, now take a fresh portion of vaseline, then stir it well to get the air taken up, place it also in the liquid, it will be seen to float. The difference in the behaviour of the two portions is caused by their different gravities, one portion holding air in suspension. Under similar treatment it will be found that most unctuous bodies emulsify air. What influence emulsified air has upon the keeping properties of fats and ointments would form an interesting subject for research. It is worthy of remark that two at least of the official ointments cannot be properly made without containing emulsified air; these are the ointments of red oxide of mercury and of boric acid. Unless they are continuously stirred while cooling they set to hard masses; stirring causes them to take up air, the air by its presence giving the ointments a finely granular soft and smooth consistence.

Emulsification of water is a common operation of pharmacy, cold cream manufacture provides an example; it is well known that the white, soft, creamy unctuousness of that article depends almost entirely on the water it holds in suspension. Butter is sometimes adulterated by being made to contain emulsified water. If we desire to incorporate an aqueous extract with a fat, it is usual to thin the extract with water, then emulsionize with the fat. The value of lanolin as an ointment base largely depends upon its containing emulsified water; the water has a softening influence on the lanolin, rendering it pliant and easy to mix; without water its consistence would be much too stiff for a good ointment base.

Emulsions prepared from the same kind of ingredients are frequently seen to differ in appearance and stability. The product of one operator is pure white, of another whitish-brown; its consistency is thick or thin; it may either separate in a few hours, or remain permanent for weeks. Differences of this kind can be accounted for by two causes, one natural, depending upon variations in drugs, due to soil, climate, period of collection, or changes effected by age; the other mechanical, in which the operator is usually at fault; for instance, the order of mixing may be varied, stirring in one case having been more vigorous or prolonged than in another, or dilution may have been effected with varying rapidity. Of the causes of variation alluded to, those which are natural are mainly outside the pharmacist's control; the best and most he can do is to select good fresh drugs, taking care they are well preserved from atmospheric and other influences. Differences due to the mechanical steps of a process we may regard as entirely under control; they are faults either of judgment or of bad manipulation. Measuring oil in a watery measure should be avoided; likewise the use of a damp or warm mortar. It is a bad practice to leave off stirring whilst an emulsion is forming; when formed a little extra stirring is often advantageous. Never starve an emulsion by trying to be economical with the gum; the result is invariably a weak product, soon breaking down, or may be an utter failure, and however much you may try to coax it into form with more gum the result is commonly unsatisfactory. Overdoses of gum are almost as bad as deficiencies; you risk getting a thick magma flowing with difficulty, whereas good emulsions flow quite easily. For the patient, it is certainly far more pleasant to get a dose that flows easily down the throat, rather than one which hangs about the fauces and nauseates quite as much as the raw oil would.

A phenomenon commonly observed during the progress of making a gum emulsion, is a cracking noise, like the breaking of a small stick; this is due to the tearing action of the pestle, causing a series of fractures in the product. It has been asserted by many authorities that this click or cracking is positive evidence that the emulsion is a success. In my experience the sign is not infallible, for on numerous occasions students have shown me their products, with plenty of crack on stirring, but in such a spoilt condition that there was not the remotest hope of turning them into emulsions.

During the past fifteen years several contributions on emulsions have appeared in the *Pharmaceutical Journal*, and in the 'Year Book of Pharmacy,' chiefly the contributions of American pharmacists, to whom we are indebted for many useful hints and formulæ on emulsions. Having repeated some of the experiments of the authors, it was thought the results obtained might be a useful addition to these notes. R. Rother, *Pharm. Journ.*, May 11, 1872, in a thoughtful paper says, "A perfect artificial emulsion is physically identical with the natural, that is as far as the extinction of the oil is concerned, and this peculiarity is the distinctive feature of an emulsion." There is one statement in the paper open to criticism, where the author says:—"A concentrated perfect emulsion is in itself the most rapid and efficient emulsifier, possessing the property of emulsifying oil to an almost unlimited extent." The fault to be found with this statement is, that it creates an impression that a perfect emulsion can be utilized for the preparation of other emulsions, thus placing at our disposal an easy means of emulsification, besides economising gum; such, however, is not the case, as the following experiment is intended to show:—Eighty grains of powdered gum, half an ounce of castor oil, and three drachms of water were converted into a perfect emulsion. A further quantity of oil was added, and found, as stated by Rother, to be easily emulsified, or it would be more correct to say combined. Further it was found that dilution of the product with oil could be carried to an apparently unlimited extent. Though this experiment is interesting its practical value is small, for as one would theoretically expect, it is found the excess of oil quite changes the character of the product; it no longer admits of dilution with water like an ordinary emulsion, but is changed to a magma, floating in and repulsing water, as if it were oil only. This change of character is due to the fact of the product being no longer, as Rother implies, an emulsion of oil, but an emulsion of mucilage; the oil being in excess constitutes the menstruum in which particles of mucilage are evenly distributed. The conditions of the case are analogous to those where ether dissolves water, and water dissolves ether. The knowledge to be gathered from the experiment is that under certain conditions mucilage will

emulsify oil; on the other hand, oil being in excess, it emulsifies the mucilage, one product admitting of dilution with water, the other dilution with oil.

Another communication to which I would draw attention is by E. Gregory, 'Year-Book of Pharmacy,' 1887. The author discusses the question whether mucilage or powder of acacia gives the best emulsions; the conclusion being that the use of mucilage should be abandoned in favour of powdered gum. Gregory states that three drachms of powdered gum will emulsify one ounce of any of the volatile oils, but rather less (about 2 drachms) will answer for the fixed oils and balsams. The author's method of procedure is to mix the gum first with the oil, and, if the above quantities be used, neither more nor less than four and a half drachms of water all added at once. The method was tested upon one ounce each of the following fixed and volatile oils, castor, cod liver, olive, almond, turpentine, eucalyptus, peppermint, and sandal wood. The result in each case was as follows:—The fixed oils all gave exceptionally good emulsions, white and as perfect as could be desired. Cod liver oil during the process became very pasty, but that condition did not in any way interfere with dilution or final completeness. Oil of turpentine was a failure, but on slowly adding two drachms more water than Gregory indicates, it gave a creamy emulsion. Oil of eucalyptus failed, and like turpentine took two drachms more water to recover it; the product was then imperfect. Oil of peppermint turned out fairly well, but a little more water improved it. Sandal wood oil gave a beautifully white and perfect emulsion, which I attribute to its having more body or viscosity than other volatile oils. Gregory's process was further applied to creasote, carbolic acid, copaiba, balsam of peru, and extract of male fern. All of these gave excellent emulsions, those of creasote, carbolic acid, and copaiba, after resting a month, appearing as perfect as on the day they were made; the male fern and peru formed creamy layers, which a gentle shake easily distributed. Taken as a whole Gregory's process is as good as any examined; the only improvement I can suggest is that, when dealing with volatile oils, each ounce requires 3 drachms of powdered gum and at least 6 drachms of water.

P. H. Dilg (*Amer. Journ. Pharm.*, 1878) approves of powdered gum for emulsions, 4 drachms of which should be added to 8 drachms of oil, then 8 drachms of water in one volume. The rule the author attempts to establish, is that 2 parts of oil needs 1 part each of gum and water. A trial of the formula, whilst giving good emulsions, turned them out much too thick; the gum is really in excess of what is needed, a 33 per cent. castor oil emulsion flowing with difficulty. On economical grounds Gregory's formula is preferable, giving better emulsions with one-third less gum.

Notwithstanding that the balance of opinion is greatly in favour of acacia, over tragacanth, for the production of emulsions, yet there are still those who hold to tragacanth and continue to recommend it; this is matter for surprise, for the more fully we know the perfect character of acacia emulsions, the more completely do those made with tragacanth pass into the shade. Tragacanth gives magmas rather than emulsions; you can easily enough combine and suspend oils with it, but examine the product, and you will plainly see that the oil globules are generally of a coarse character, distinctly visible to the unaided eye. Further, tragacanth emulsions lack that milk-like fluidity, pure whiteness, and capacity for easy dilution, so characteristic of acacia emulsions. The difference obtainable by the two gums may reasonably be attributed to their difference of constitution. In a tragacanth emulsion the swollen colloid bassorin appears to have the power of keeping the globules of oil from coalescing, not by virtue of its viscosity, but rather by providing an obstacle to the movement of the oil. On the other hand, in a perfect acacia emulsion each particle of oil is no doubt surrounded by an envelope of perfectly soluble gum, both together forming a cell, having enough resistance to prevent coalescence with contiguous cells. At this point I am constrained to make a few remarks on the cod liver emulsion of the Unofficial Formulary made, as you know, with tragacanth. Like Conroy, my attempt to make a good emulsion of it was a failure. The oil is well incorporated and suspended, but badly divided; however well it may be shaken it shows, on inversion, oil globules flowing down the bottle side in a state of division that certainly would not satisfy a fair critic. It would have been better, as Conroy suggests, to have made it with gum acacia.

Tinctures of senega and quillaia possess remarkable properties as temporary emulsifying agents, remarkable because of their power, in very small quantity, to divide and pulverise substances when gums fail. If you place in a bottle 1 ounce of chloroform, 20 minims of tincture of senega, and a few drachms of water, then shake them well, and make up to 5 ounces with water, you get a product in which the chloroform is seen to be divided into an immense number of globules; these globules do not remain long suspended; they readily subside, but will rest together for hours without coalescence. After a day or two a portion of chloroform is found broken down. Mercury, ether, or essential oils can be divided in the same manner; a singular feature about the mercury is that it succeeds best when gently shaken, violent agitation restores it to its original form. Mr. H. Collier, of Guy's Hospital, 'Year-Book of Pharmacy,' 1879, gives some formulæ for senega-made emulsions. These I find are very useful for hospital work, where, as a rule, the time allowed for the work done is much too brief; but in private dispensing, senega will never be regarded with much favour, on account of the temporary character of its products.

The flavouring and preservation of emulsions is a branch of the subject which certainly ought not to be overlooked. Although an emulsion may be therapeutically and mechanically perfect, it often is nauseating to the taste and offensive in odour. Flavouring, though only an adjunct, therefore of minor importance, still does contribute elements of value to a medicine. The pharmacist has a great variety of flavours at his command; his chief difficulty perhaps is to select the one which would give most general satisfaction. The common favourites among flavours are those used in cookery, such as the volatile oils of almond, cinnamon, cassia, cloves, lemon, the essence of vanilla, and orange flower water. My own opinion of these, as regards permanency, palatability, and power to disguise, is in favour of essential oil of almonds, used in the proportion of 1 minim to each ounce of oil emulsified. An elegant cod liver oil emulsion, in which taste and odour are well masked, is made as follows:—

Take of—

Cod liver oil	4 ounces.
Powdered gum acacia	1 ounce.
Oil of cassia	4 minims.
Oil of almonds	4 minims.
Saccharin	2 grains.
Water to make	8 ounces.

Mix the oils with the gum and saccharin in a dry mortar, add 2 ounces of water in one volume, stirring till the emulsion is formed; finally, add sufficient water to make 8 ounces.

Castor oil is very well disguised in the following formula:—

Take of—

Castor oil	1 ounce.
Powdered gum acacia	3 drachms.
Essential oil of almonds	2 minims.
Oil of cloves	1 minim.
Saccharin	1 grain.
Water to make	4 ounces.

Mix the oils with the gum and saccharin in a dry

mortar; add 4 drachms of water at once, stirring till the emulsion is formed; dilute to 4 ounces with water.

My experience with yolk of egg emulsions has been very limited, but singularly, whilst writing these notes, a prescription for a cod liver oil and egg emulsion was presented me to dispense. The ingredients for each dose were cod liver oil, 1 drachm; yolk of egg, ½ a drachm; water to 1 ounce; no flavouring of any kind. It made up very well; the order of mixing was to gradually pour the oil on to the yolk of egg, with constant stirring, then dilute with water; on transference to a bottle a vigorous shake improved it. The dose 1 ounce, containing 1 drachm of oil, being for a child, seemed to me unduly diluted, and wanting in finish, so after a few experiments the following improved formula was arranged:—

Take of—

Cod liver oil	4 ounces.
Yolk of egg	2 „
Common salt	25 grains.
Saccharin	2 „
Oil of cloves	8 minims.
Water to make	8 ounces.

Rub the oils gradually with the yolk of egg, salt and saccharin, till an emulsion is formed, make up to 8 ounces with water and shake well.

The product is a thin, but most perfect emulsion, which can be flavoured with any desired aromatic in place of cloves. Such a combination seems admirable in many ways; its taste is very mild, the nutritious value of the oil is enhanced by the yolk of egg, and the emulsion can be made by the merest tyro without risk of failure.

Having saccharin at our disposal it provides us with a useful substitute for sugar in emulsions. Its advantages are that it adds nothing to the thickness of the product, and cannot give rise to fermentation. The method found most convenient for using saccharin, is a 10 per cent. solution, made by rubbing the saccharin smooth with a little water, then adding bicarbonate of sodium till effervescence ceases; 20 grains of the saccharin takes 8 grains of the soda salt. The product is a neutral saccharin salt of soda, freely soluble in water and easily miscible with neutral or alkaline fluids, but giving a precipitate of saccharin with acid solutions.

Salt is occasionally taken for masking the taste of cod liver oil; it combines well with oil in emulsions. The taste of the oil is well covered, especially if a little oil of clove be added in addition to salt. No argument is needed to justify such a combination, as it forms a salted animal food; moreover, the salt is admirably adapted to keep the oil sweet and free from rancidity.

To keep emulsions for long periods is not desirable. They are best freshly made. Should it be desired to preserve them, recourse must be had to such antiseptics as boric or salicylic acid, or better perhaps a simple tincture of benzoin, or even pure chloroform. The latter is a most powerful antiseptic, imparting an agreeable sweetness; one minim may be added to each ounce of emulsion.

The last four or five years, it has been noticed as a growing practice among medical men and others, to call all preparations holding finely divided suspended matter emulsions. It is a common occurrence in my pharmacy to be asked to prepare an emulsion of boric acid, salicylic acid, or iodoform, in olive oil or glycerine. If it is correct to apply the word emulsion to such preparations, then we may extend its meaning to all examples of uniform suspension, so that a bismuth or rhubarb mixture becomes an emulsion. This widening of the meaning of the word is, in my opinion, perfectly legitimate, and even consistent with our own practice. When we emulsify a solid resin, as copaiba or benzoin, our whole aim is to get the solid finely divided and evenly distributed; this accomplished the product is called an emulsion. Therefore it is reasonable enough to argue that the suspension and equal distribution of any finely divided solid in a soft or liquid medium equally constitutes an emulsion. It does not matter whether benzoin or bismuth be suspended, the mechanical conditions are precisely the same. The views here expressed are supported by a paragraph in the *Chemist and Druggist* for November 5, where August Brunner, of Heidelberg, gives a note on iodoform emulsion in glycerine; further, photographers have for many years used emulsions of insoluble silver salts in gelatine.

In conclusion, I wish to acknowledge the assistance of Mr. C. Collingwood Fenwick in conducting the experiments which this paper involved.

The President, in opening the discussion, tendered on behalf of the Association their sincere thanks to Mr. Gerrard for his eminently practical paper.

Mr. Joseph Ince heartily congratulated Mr. Gerrard upon the manner in which he had brought this subject again before them. He had to agree, in the main, with Mr. Gerrard, which, perhaps, was a bad thing for a discussion. The chief merit of the paper was the direct practical experiments which controlled the more theoretical portion. Referring to some of the transatlantic methods which had been mentioned, he thought that the style of American pharmaceutical journalism was more to be deprecated than American pharmacists, as too much stress and importance was placed upon the single experiments of one man. Thus a recent American writer said a good and perfect emulsion would stand heat, and gave this as a distinguishing test. He could not point out too strongly that this was not a true test, as only age and durability could distinguish a perfect from an imperfect emulsion; moreover his experience invariably showed that emulsions however well made would inevitably separate on the least application of heat. For that reason the least heat, even mechanical, in performing the operation should be avoided. There were three principal methods by which emulsions could be made. First, mucilage of acacia: this unquestionably was the easiest and most fitted for the tyro. Second, powdered gum: this, the continental method, required more experience and dexterity. Third, the instantaneous mixing of oil, gum and water together, by no means so easy as the other methods, but undoubtedly superior when it could be done. He confirmed Mr. Gerrard's experience that the gum acacia at the present day was distinctly inferior to that in use several years ago, for he now found it almost impossible to keep it in the form of mucilage for a week and sometimes not more than three days. The value of senega as an emulsifying agent, he considered, had been much overrated, although convenient for rapid emulsifying; but in his experience the emulsion thus made would not keep even an hour. Quillaia, as far as he was aware, was not used to any extent in English pharmacy, although it had found much favour in America.

Mr. H. Collier (Guy's Hospital) thought that the name emulsion should be strictly confined to the minute division and suspension of fixed and volatile oils, balsams, and oleoresins. For this purpose he knew of nothing so good as quillaia or senega. He exhibited an emulsion of mercury made eight years ago with tincture of senega, which he considered perfectly emulsified, for the globules were divided as in grey powder. Chloroform might also be quickly emulsified in the same manner, and if left for a considerable time would not separate. If it were thought necessary that an emulsifying agent should add viscosity, so as to keep permanently for a very great length of time, senega and quillaia fail. This feature, however, he did not consider essential, and he knew of many instances where taking a viscous emulsion was thought to be as bad as taking the oil itself, whereas emulsions made with senega were very fluid and totally unlike the oil. Besides, the great advantage was that instant agitation would produce the emulsion, and this in hospital dispensing (although no pains were spared when necessary) was of great importance. He firmly maintained the exceptional value of senega, although willing to admit its deficiency in adding viscosity and permanency.

Mr. L. Tompsett asked if Mr. Gerrard had experimented as to the emulsifying power of the pancreas and with what success.

Mr. W. G. Blackham thought that an emulsion, as defined by Mr. Collier, was one that would separate most readily, as he noticed that the mercury and senega emulsion had already separated. He agreed, however, that the advantages of increased fluidity and rapid preparation were important, but in his experience emulsions that kept the longest were taken the most readily. He considered the emulsio olei morrhuæ of the Conference Formulary was not a true emulsion, as he found the tragacanth separated in little masses, and the oil in globules was still to be seen on the surface; he agreed with Mr. Gerrard that an increase of spirit would obviate this.

Mr. F. McDiarmid had always thought that the necessity for the constant stirring of boric acid ointment when cooling was due to the presence of the hard paraffin, so as to prevent it solidifying first. He asked if Mr. Gerrard had experimented with lanolin, as recently having to emulsify it in the presence of spirit, mucilage being inadmissible, he had found yolk of egg to answer admirably. He further enquired if mucilage of Irish moss had been tried. He noticed that saccharin was used in some of the formulæ, and from his experience he was of opinion that it was much less soluble than had been stated.

Mr. T. A. Ellwood was able to confirm many of Mr. Gerrard's experiments, but thought that the quantity of acacia recommended to suspend oleoresins was hardly sufficient, double the amount being in his hands nearly always necessary. He would like to know upon what grounds the incorporation of air into a body could be called an emulsion. He recited a definition of an emulsion, and thought that the best test of a perfect emulsion was the rapid dilution with water. He considered the ointments of heavy bodies were instances of incorporation and suspension, and not emulsions. He felt much surprised at Mr. Collier's eulogy of senega and quillaia, and suggested that he used a quantity which would have decided medicinal action. Soap might have been mentioned in the paper, for its action in suspending is not saponification, as it is a perfect salt already. He always advocated the third method mentioned by Mr. Ince, but found that it certainly required a considerable degree of skill and dexterity. A trial of Irish moss mucilage seemed only a repetition of tragacanth, and with the same objectionable features.

The President confessed some surprise at Mr. Gerrard's definition of an emulsion with reference to the incorporation of a gas into a body, but admitted that it had been supported by some very good reasons. He thought that the trial of an emulsion by its pleasancy, permanency and fluidity was hardly sufficient, and that a more important point was the digestibility; from this point, therefore, alkaline emulsions would appear disadvantageous, as they would be thrown out by the acid of the stomach.

Mr. Collier explained that the mercury and senega emulsion was shown as an example of a finely divided, not as an inseparable body. He did not think that quillaia or senega were perfect, for undoubtedly gum acacia was best. He found that half an ounce of cod liver oil required twenty minims of tincture of senega to emulsify it; although this would separate in a few hours, yet the oil is in a fine state of division which the least shake would make uniform and allow of pouring out.

Mr. Gerrard, in reply, thanked the speakers for the animated discussion which had taken place, and as he had a good deal to answer for would reply in detail. He expected criticism, and thought it much better that in an Association of this kind a paper should be of such a nature that it might be understood and discussed by all. He agreed with Mr. Ince that there was considerable looseness in American literature; perhaps it was the want of a dexterous wrist, for many of their formulæ had failed. He thought that with a good formula one would invariably meet with success, but rule of thumb was to be deprecated. Mr. Collier had warmly advocated senega, but he thought he detected some wavering in his opinion now. He did not like senega, but it was certainly useful, and if used in small quantities there could not be much objection. In an emulsion division was most necessary, and the oil globules should be rendered so homogeneous that the eye was deceived. He drew the line, however, at the oil emulsion of the Conference Formulary, which he considered merely a mechanical mixture. Pancreas with lard caused it to take up more water, but it could not be diluted to any extent, and he did not think it could be considered an emulsifying agent in the ordinary sense. Boric acid ointment, as used at the hospital, required the presence of emulsified air, as only then could it be removed from wounds without leaving any adhering parts. His experience showed that the solubility of saccharin was much overstated. With regard to the criticism of his definition of an emulsion, he took it that air was a fluid, and when finely divided and introduced into a body it might be safely considered emulsified. No objection was raised to the suspension of guaiacum being called an emulsion, and in that case only finely powdering was required; a liquid like chloroform might also be emulsified, so why should not the term include air?

The proceedings then terminated.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, November 3, Mr. William Crookes, F.R.S, President, in the chair.

The following papers were read:—

Note on the Atomic Weight of Gold. By T. E. Thorpe, F.R.S., and A. P. Laurie.—In a former paper (*Trans.*, 1887, 565) the authors gave as their final result of twenty-five determinations of the atomic weight of gold the number 196·85, which differs by 0·21 from the value determined by Krüss. Krüss has sought to show, however, that this difference is probably due to the presence of free gold in the bromoaurate of potassium employed by the authors (*Berichte*, 1887, 2365). The authors reply that they were unable to detect any free gold in the salt used by them, and that they therefore altogether dissent from Krüss's conclusion that the lower value of 196·64 is to be preferred.

The President inquired whether the authors had ever attempted to purify the gold by distillation? Stas had stated that it could be volatilized by means of the oxyhydrogen flame, and he had had occasion to confirm this observation—in fact, gold boiled violently when heated in a lime crucible by means of the oxyhydrogen blowpipe.

Professor Thorpe replied that no doubt the method suggested might be employed to purify gold. They had obtained their material from the Mint: the only impurity which might have been present was platinum, but it was improbable that it was, as a quantity which might escape detection by qualitative chemical tests appeared to be capable of rendering the gold brittle.

The Interaction of Zinc and Sulphuric Acid. By M. M. Pattison Muir and R. H. Adie.—The experiments described are altogether qualitative. The authors have examined the interaction between sulphuric acid of varying concentration and zinc of different degrees of purity. If pure or nearly pure zinc and moderately dilute sulphuric acid interact at moderate temperatures, they give zinc sulphate and hydrogen only; as temperature and concentration increase the quantity of hydrogen produced decreases, and sulphur dioxide and sulphuretted hydrogen begin to appear. With concentrated acid and nearly pure zinc the chief gaseous product is sulphur dioxide. When commercial zinc is used sulphur dioxide and sulphuretted hydrogen are produced at almost all temperatures, even with acids as dilute as $H_2SO_4 \cdot 100 H_2O$.

Zinc sulphate is the only solid product of the interaction at any temperature or concentration of acid. The reaction with platinized zinc-foil resembles that with commercial zinc; in both cases sulphur is formed at moderately high temperatures when fairly concentrated acids are employed. Variations in the relative mass of zinc employed are without regular influence on the nature of the products of the change. The possible sources of the sulphur and the sulphur compounds are discussed in the light of the tabulated experimental results. The general conclusion is that the interaction between nearly pure zinc and sulphuric acid of different degrees of concentration is chiefly a direct chemical reaction; but that when less pure zinc is employed the reaction is largely electrolytic. The marked influence of concentration and temperature, in every case, makes it probable that the reactions are many and complex, and that they occur between zinc and various molecular aggregates of H_2SO_4 and H_2O, or of H_2SO_4, SO_3 and H_2O.

In answer to Mr. Groves, Mr. Muir said that they had not ascertained whether the sulphur which was produced was the soluble or the insoluble modification. Replying to Mr. Harcourt he said that they had not attempted to take into direct account the influence of varying amounts of zinc sulphate; he thought, however, that if it had exercised any particular influence this would have been noticed in the course of the experiments, as the conditions had been very greatly varied.

Dr. Armstrong expressed his surprise that the authors should have made in the beginning of their paper a halting confession that interactions such as that between sulphuric acid and zinc were "to some extent at least electrolytic"; and still more that they should state the opinion that their experiments afforded evidence that in the case of approximately pure zinc "chiefly direct chemical interaction" takes place. It was very remarkable that chemists did not recognize, as physicists had done, that the chemical and electrical phenomena were in such cases absolutely interdependent. The authors had brought forward a large amount of valuable information in their paper, but he could not conceive how any of their evidence could be interpreted as proof of direct chemical interaction—whatever that expression might mean.

In reply to Dr. Armstrong, Mr. Muir stated that by the expression "direct chemical interaction," as compared with the expression used when speaking of the action between sulphuric acid and commercial zinc, viz., "a reaction partly chemical, and also to a large extent electrolytic," the authors meant that in one case zinc, sulphuric acid and water interact in the manner usually called chemical, and that the products are either hydrogen and zinc sulphate, or, with a different concentration of the acid and a different temperature, hydrogen, zinc sulphate and sulphur dioxide; while in the other case, besides this change, another occurs, viz., the decomposition of the acid by the electric current produced in the chemical reaction occurring between the acid, the zinc and the other metal or metals in the specimen of zinc used. The first change might be, and probably was, electrical as well as chemical; but, if so, the generally used term, "chemical interaction," is here employed to include the electrical as well as the chemical part of the whole occurrence.

Note on Safety Taps. By W. A Shenstone.—The author has previously pointed out ("Methods of Glass Working," pp. 64–6) that the safety taps recently introduced are open to the rather serious objection that they offer no special resistance to the passage of air in the direction in which leakage is most likely to occur, and that therefore such taps are only trustworthy when employed in conjunction with suitable mercury traps. But it had hitherto escaped his notice, and probably that of others also, that even when so protected these taps are still of unsatisfactory construction, as when the properly lubricated plug of the tap is brought into position the space below the plug remains full of air. If the tap be well made, nearly all this air will remain there during the exhaustion of any vessel that may be attached to either arm of the tap; but afterwards, especially if the lubrication of the tap becomes imperfect, air will gradually find its way from below the plug into any apparatus that may be attached to the tap.

To remove this imperfection a very simple alteration only is required, viz., that the plug shall be drilled so that when the tap is open there is free communication between the space below the plug and the contents of any apparatus of which the tap may form a part.

The President exhibited and described two safety taps, the one sealed in one, the other in two directions, by mercury, which were not open to the objection raised by Mr. Shenstone.

Mr. Shenstone subsequently pointed out that the chance of leakage was very much reduced by placing the two arms of the tap at different levels and bringing them into communication by drilling a hole diagonally through the plug; and he particularly insisted on the importance of this modification of the ordinary method of construction.

Note on Guthrie's Compound of Amylene with Nitrogen Peroxide. By A. K. Miller, Ph.D.—In the examination of the products of the manufacture of oil-gas (Armstrong and Miller, *Trans.*, 1886, 74) the want of a method of identifying different unsaturated hydrocarbons was keenly felt, and experiments in more than one direction are in progress, which, it is hoped, may lead to a satisfactory solution of the difficulty of analyzing complicated hydrocarbon mixtures of a similar nature. It appeared to be not improbable that nitrogen peroxide might prove a valuable reagent for the recognition of some of the constituents, as it was known to combine with certain unsaturated hydrocarbons to form well-defined crystalline derivatives; and it was further hoped that perhaps a reagent might be discovered which would characterize N_2O_4, and might be of service in studying the vexed question of the existence of gaseous N_2O_3. It was conceivable that the formation of crystalline compounds depends on a particular molecular grouping of the carbon and hydrogen atoms, and that they will be producible from a homologous series of like constituted hydrocarbons only and not from their isomerides. A few preliminary experiments only have yet been made, the work having been postponed from last winter, owing to the great difficulty of working with such very volatile hydrocarbons and such comparatively unstable substances in hot weather. The reason for already bringing the subject before the Chemical Society is the recent publication of a paper by Wallach (*Annalen*, ccxli., 288), who has to some extent anticipated the author's line of work. Many years ago Guthrie (*Annalen*, cxix., 83) showed that when commercial amylene and nitrogen peroxide were brought together, combination took place, the products being a definite crystalline substance, $C_5H_{10}N_2O_4$, which decomposed sharply at 95°, and an oil. Although commercial amylene is known to consist chiefly of trimethylethylene, no proof had been given that Guthrie's compound is derived solely from this hydrocarbon, and not from some other constituent. This being a point of importance in connection with the research as indicated above, pure trimethylethylene was prepared from commercial amylene by agitation with sulphuric acid, etc., according to Wischnegradsky's method (*Annalen*, cxc., 328). The action of pure nitrogen peroxide on trimethylethylene and on the residual amylene was then separately examined. Trimethylethylene, dissolved in either carbon bisulphide or glacial acetic acid cooled by iced water, was converted almost entirely into Guthrie's crystalline compound; some green oil was also produced, but this crystallized for the most part on standing. On crystallizing the product from benzene, prismatic crystals were obtained which decomposed sharply at 99°. No signs of the needles described by Wallach (*loc. cit.*) were observed. On submitting a small portion of the residual amylene to the same treatment, no crystals were produced, and on

pouring the product into water a separation into three layers was observed. The lowest layer consisted of a heavy oil, which could not be made to crystallize by cooling to −10°, or by exposure to air. The uppermost layer was very volatile, and consisted in all probability of pentane originally present in the amylene. Experiments were also made with normal amylene and normal hexylene; these both yielded oily products heavier than water and which also refused to crystallize. From these results it would appear that trimethylethylene is the only constituent of commercial amylene which yields a crystalline derivative with nitrogen peroxide. It remains to be seen how the isomerides behave.

Professor Dunstan asked whether Dr. Miller had examined the action of reducing agents on Guthrie's compound. He suggested this as a test of the correctness of the formula proposed by Wallach, which represented the compound as a nitrosyl nitrate, a view which Victor Meyer had previously rejected, because he obtained all the nitrogen in the form of ammonia on reducing with sodium amalgam. The action of ferrous hydroxide might decide the question, since nitrosyl, if present, would probably yield hyponitrite, while the nytroxyl, being unattacked by the weak reducing agent, would form amyl nitrate.

Dr. Miller replied that he had not.

The Dehydration of Metallic Hydroxides by Heat, with Special Reference to the Polymerization of the Oxides and to the Periodic Law.. By Professor Carnelley, D.Sc., and Dr. James Walker.

The Bromination of Naphthalene β-Sulphonic Acid. By G. Stallard.

The Constitution of the Three Isomeric Pyrocresols. By W. Bott, Ph.D.

Preliminary Note on Certain Products from Teak. By R. Romanis.—The author finds that alcohol extracts a soft resin from teak, but no oil or varnish. On distilling the resin he obtained a crystalline substance which he also found to be present in considerable quantity in the tar resulting from the destructive distillation of teak. The analyses which he has made for the crystals point to the empirical formula C_9H_8O. On oxidation with nitric acid they yield what appears to be a quinone of the formula $C_{18}H_{16}O_2$.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Solution of Saccharin.

Sir,—A formula issued by an authority sufficient to procure uniform adoption, which would produce a solution of saccharin equal in sweetening power to Syr. Simp. B.P., is at the present moment an important desideratum, as such a preparation would not only be useful in its simple form, but would also serve as a standard for making sweet solutions equal to the syrups of the Pharmacopœia.

In a difficulty of this kind one naturally turns to the British Pharmaceutical Conference Committee for immediate aid, and on communicating with the Chairman of the Committee on the subject, he pointed out that, if his Committee thought it desirable, some time must of necessity elapse before such a formula could be produced, as before publication all formula must receive the sanction of the executive of the Conference. Meanwhile, however, many preparations have arisen to perplex both the prescriber and dispenser, for it is really difficult to determine what is intended when either sol. saccharin, elixir saccharin or spt. saccharin are designated.

On the other hand it is not at all surprising, or even a matter for deprecation, that immediately upon the appearance of this, or any other similarly important substance, upon the market, such preparations as these should almost instantly follow, because the individual pharmacist is compelled to satisfy (in elegant form) the requirement of the physician, which now has become coincident with the introduction of the raw material.

I should have preferred to have left the discussion of this subject in other hands, had it not been for the note you have published from Mr. Barnes, whose experience so entirely differs from my own that it ought not to pass without question. The relative degree of sweetness between saccharin and sugar is a matter of some difficulty to determine with exactitude, but so far as my examination of saccharin goes one grain does not nearly represent the sweetening power of ℥j Syr. Simp. B.P. By testing it comparatively, side by side with a good sample of refined sugar, I found that about 130 grains of sugar were required to produce a sweetness equal to one grain of saccharin, but a little allowance was made in favour of the latter in deference to the published record of its sweetness, and three grains were taken as representing an ounce of sugar, or 48 grains, with an equal quantity of soda carb., to produce one pint of solution equal to Syr. Simp. B.P.

Working on this assumption I have made several preparations, at the desire of local physicians, which either *per se*, or when introduced into mixtures, appear very nearly to approximate in sweetening power to the saccharine preparations of the B.P., which they were intended to supersede.

It should be noted also that in a report of the recent Brewers' and Mineral Water Manufacturers' Exhibition at the Agricultural Hall there was some notice of saccharin in its application to certain beverages, and it was stated that for practical purposes 1 of saccharin had been found equal to 129 of refined sugar.

Whether or not saccharin will become an article of daily consumption time alone can prove, but Mr. Naylor (3rd series, No. 906, p. 377) very properly hints at a serious objection to its employment, for in some cases it leaves such an intense after-sweetness as to become nauseating; this I have ascertained to be purely an idiosyncracy, although it asserts itself to a considerable extent.

Kilburn, N.W. Charles B. Allen.

Elixir of Saccharin.

Sir,—As Chairman of the Formulary Committee of the Pharmaceutical Conference I have been requested by some of its members to recommend the following as a provisional formula for dispensing purposes:—

Elixir of Saccharin.

℔ Saccharin	24 grains.
Bicarbonate of sodium	12 grains.
Rectified spirit	1 fluid drachm.
Distilled water	7 fluid drachms.

Rub the saccharin and bicarbonate of sodium in a mortar with the water gradually added. When dissolved add the spirit and filter.

Twenty minims contain 1 grain of saccharin. This is sufficient to flavour a 4-ounce mixture.

Mr. Barnes's formula, published last week, makes the preparation unnecessarily alkaline, and it might not keep indefinitely.

Wm. Martindale.

L. Watson.—In a case heard in Edinburgh this year and reported in the *Pharmaceutical Journal*, March 5, p. 732, the sale of laudanum by an unqualified assistant was held to be an offence under the Pharmacy Act and a penalty was imposed.

W. Jones.—The wine would appear to have undergone what is known as the viscous fermentation, and, if so, it cannot be rendered again fit for use.

J. W. Lasham.—We are unable to suggest any agents likely to succeed if those mentioned have been tried and failed.

G. W.—Some species of *Galium*, probably *G. saxatile*. It is impossible to name plants with certainty from mere fragments.

A. S.—Any evident impurities from the gum should be removed, but the mixture should not be strained.

W. R. G.—The decoction will not be clear, but it should only be strained, not filtered.

J. M. D.—Possibly a mixture of some white pigment with strong glue would answer your purpose.

Communications, Letters, etc., have been received from Messrs. Fisher, Brown, Greenish, Baildon, Haydon, One of the Craft, J. P. H., A. P. S.

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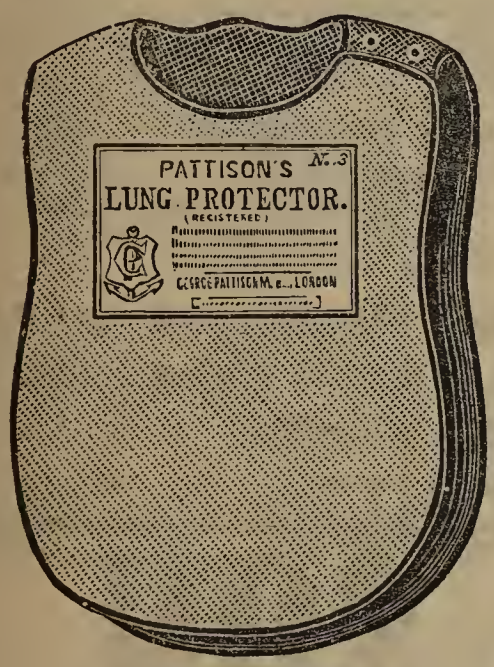

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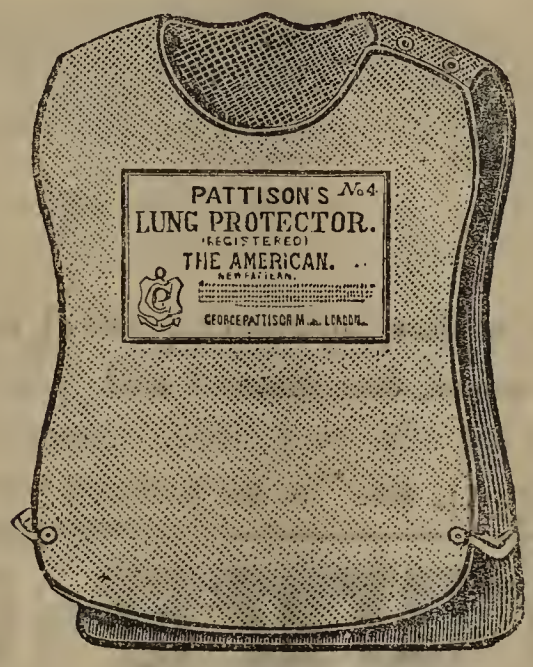

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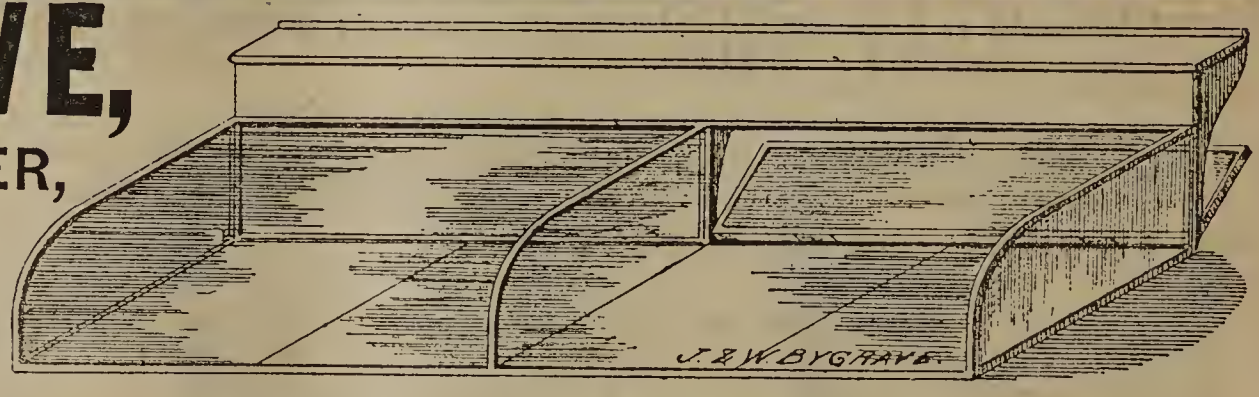

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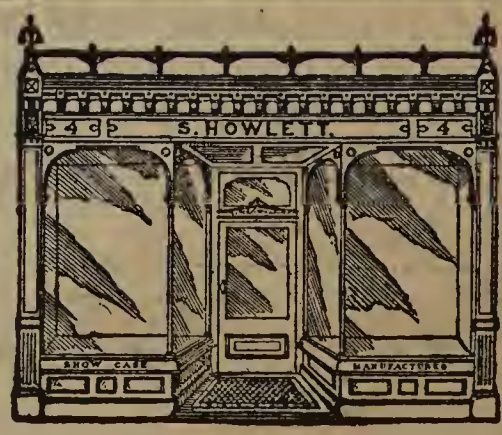

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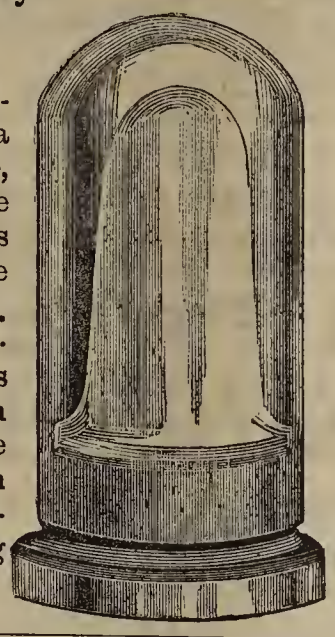

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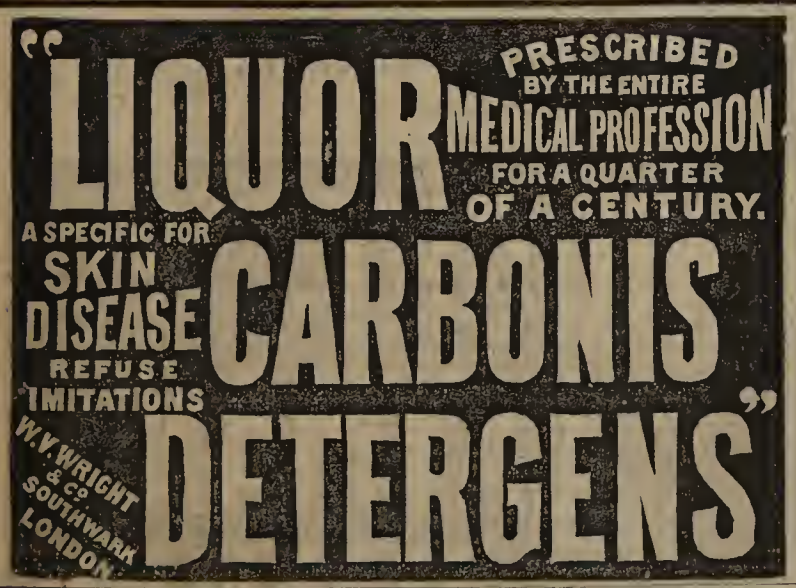

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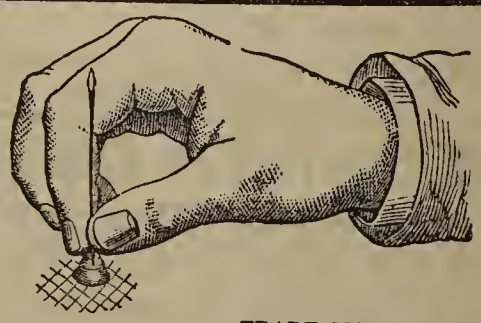

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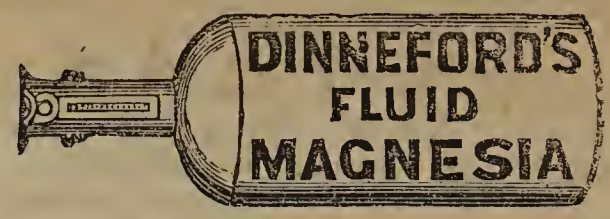

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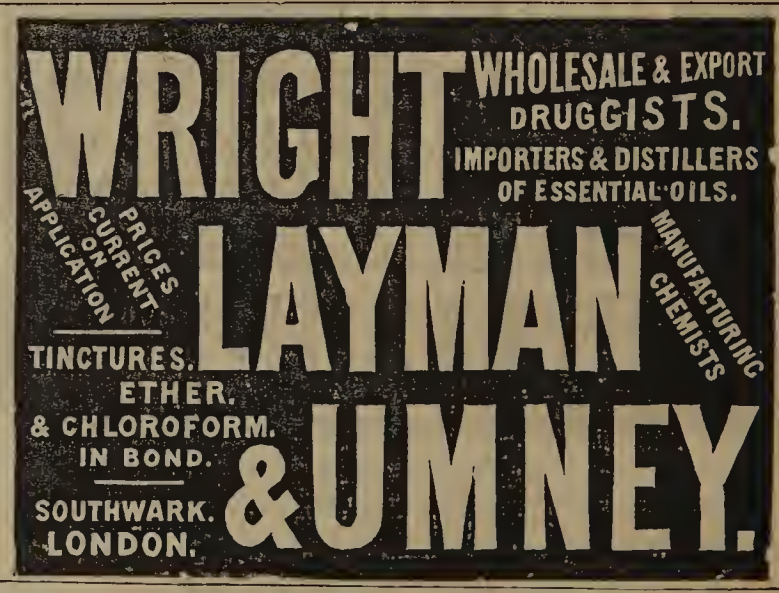

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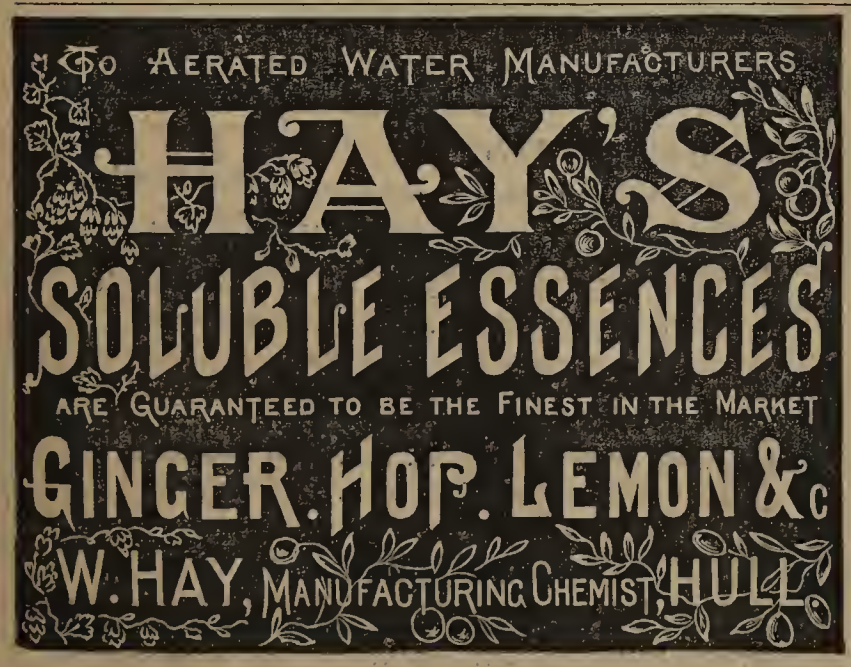

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At the Pharmaceutical Examinations held last month, the following Students of this College were successful :—

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„ W. J. COLLETT .....Nantwich.

MINORS.

Mr. D. S. BARBER .....Dursley.
„ J. M. BEANLAND .....Keighley.
„ H. B. BILLINGTON.....Barnsley.
„ G. BIRKETT.....Morecambe.
„ W. T. BLEWETT.....Penzance.
„ C. COTTON.....St. Helens.
„ J. H. DUNN .....Hull.
„ J. G. EVERETT .....Ipswich.
„ J. B. FORSTER .....Carlisle.
„ A. R. FRESSON.....Stevenage.
„ L. A. HUTCHIN.....Saffron Walden.
„ W. H. P. KENT..... ...East Molesey.
„ G. INGLE.....Bradford.
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„ W. PLUMBLY.....Norwood.
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„ T. A. WHITE.....Basingstoke.
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„ A. L. WYCHERLEY .....Whitchurch.

PRELIMINARY.

Mr. J. BAKER .....London.
„ T. S. CAMPKIN .....London.
„ W. F. ELLIS ....London.
„ S. M. GREEN .....London.

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22 Minor Candidates presented themselves, of whom the following 18 were successful :—

MR. R. H. BARKER.
„ R. COLEY.
„ E. B. DUNN.
„ A. E. FARDON.
„ W. G. GALE.
„ A. P. GOLDEN.
„ A. F. HEALD.
„ G. H. HORNE.
„ J. A. JENNINGS.
MR. S. H. HALL.
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PASS LIST FOR OCTOBER,

MINOR.

5 sent in, **all passed**, viz.—

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„ H. MADDOCK .....Manchester.
„ J. W. WHITELY .....Gainsborough
„ F. H. WILKINSON .....Tranmere.

PRELIMINARY.

2 sent in, **both passed**, viz.—

Mr. J. R. AMBLER .....Birkenhead.
„ H. SCHUHMACHER..... .....Liverpool.

JULY.

4 passed the Minor, **all at their first attempt**, viz.—

Mr. W. BENTLEY.....Egremont.
„ F. BIRKETT .....Workington.
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A QUALIFIED Assistant. Out-door. About 23 years' of age. Accustomed to the routine of good Dispensing and Retail. Only one kept. Apply, stating age, height, salary required, and if convenient enclose photo., to Holden & Kendall, 30, Pavement, York. Letters not answered in four days declined.

A JUNIOR Assistant. Indoors. Of good address and obliging business habits. Accustomed to ready money retail and dispensing business. Personal application if possible or enclose carte, Thomson & Co., Pharmacists, 137, Queen's Crescent, N.W.

JUNIOR Assistant. Indoor. Must have passed Minor examination and been accustomed to good Dispensing business. Apply, stating full particulars as to age, experience, salary and references to Brady & Martin, Newcastle-on-Tyne.

MR. BRUNTON requires a qualified Assistant about 25 years of age. One who speaks French preferred. Good address and recommendation indispensable. Apply, 160, Earl's Court Rd., Kensington, S.W.

A JUNIOR Assistant, accustomed to good class business. Apply to Shirtliff & Co., 66, Goldhawk Rd., London, W.

ASSISTANTS WANTED.

AN Assistant. Wanted at once. Age about 22, who has been accustomed to mixed country business. Must be active, gentlemanly and obliging. Apply stating age, height, salary and experience, with references, to Shadford & Co., Chemists, Spalding.

PARIS.—Roberts & Co., 5, Rue de la Paix, require an Assistant who speaks French and thoroughly understands the business. Apply, Roberts & Co., 76, New Bond St., London.

JUNIOR, in a select business in London. A good Dispenser and Salesman, not younger than 20, and an abstainer. Particulars in full by letter, with photo. W., care of Barclay & Sons, 95, Farringdon St., E.C.

DRUGGIST'S Second Hand wanted for shop in Glasgow. One acquainted with Patents preferred. Apply, with testimonials, and stating salary expected, to Honeyman & Starke, Solicitors, 43, West Regent St., Glasgow.

JUNIOR Assistant. Good Counterman and Prescriber may learn of good situation by applying to Q. S., care of Messrs. Ismay and Sons, Newcastle-on-Tyne. Applications unanswered in three days respectfully declined.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

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RE WOODLIFFE, deceased. Valuable Drug Business to be disposed of immediately, at Bridlington, Yorkshire. Established 40 years. Average return £800 per annum. The shop is well fitted. Valuation about £130. No good will. Apply to Mr. F. Creaser, Bridlington.

A GENUINE Business. Corner Shop. Main thoroughfare. Splendid position. Mahogany fittings, nearly new. Rent £40. To be sold by private treaty or valuation. Stock and fixtures in first rate condition. Could be reduced to suit purchaser. About £250-£300. Apply H. B. Dixon, 107, Stafford St., Hanley; or Mr. F. Brett, 60, St. Stephen's Rd., Leicester.

NOTTINGHAM.—Ready-money Business in thickly populated district. Established 20 years. Little opposition. Returns £8 per week. Sole cause for relinquishing, ill-health. Good house, with 4 bedrooms and sitting room. Rent £25. Splendid opportunity for a Chemist and Dentist. Price £250. Apply to Thomas Hopkinson & Co., Wholesale Druggists, Nottingham.

OLD-ESTABLISHED Retail. Returning about £600 under Assistant. Principal could greatly increase returns. Of very commanding appearance. Exceptionally good house. Rent £75, worth £100. Taxes only £12. Trial allowed. Price about year's returns. Part can remain. Cause of sale, unable to attend to it. Chemist, Barclay's, 95, Farringdon St., E.C.

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STAFFORDSHIRE Potteries.—For sale, a Chemist's Business. Returns exceed £700. Rent low. Price £450. Full particulars to bonâ fide purchasers. Apply, Potteries, care of Evans, Sons & Co., 56, Hanover St., Liverpool.

BUSINESSES FOR DISPOSAL.

MESSRS. BERDOE & CO. have for transfer :— WARWICKSHIRE. Unopposed Retail and Prescribing. Returns £800. Rent £35. Good house and garden. Net profit £300. Price £750, or offer. WEST OF ENGLAND. Good class Retail, Dispensing and Prescribing. Returns £800. Full prices. Several valuable proprietaries. Price £600. SUFFOLK. Unopposed Retail and Prescribing. Returns £450. Net profit £250. Good house and garden. Price £400, and part remain. NOTTINGHAM. Retail and Prescribing. Returns £600. Low rent. Good house. Price £325. NORFOLK (Seaside.) Retail and Dispensing. Returns £600. Same hands 20 years. £100 goodwill, and valuation. LONDON, N.W. Fine corner shop, well fitted and stocked. Returns £600 by manager. Price £500, and part remain. W. Retail and Dispensing. Returns £650. Very profitable. Price £500. S.E. Main road. Returns £850. Net profit £350. Price £800, or offer. Please apply, 30, Jewry St., Aldgate, City.

LONDON, S.E.—A good old-established Retail, Prescribing and Dispensing BUSINESS, in a main thoroughfare. Returns nearly £1000. Net profits last year over £400. Low rent. Valuable lease. Good opening for Dentistry. Proprietor retiring. Price £1000. R. E. M., Burgess, Willow & Francis, 101, High Holborn, W.C.

IN the main thoroughfare of a London suburb. An old-established Dispensing, Prescribing and light Retail BUSINESS, for immediate disposal. Satisfactory reasons given. Returns about £500, bearing good profit, capable of increase. Price £340. Every investigation. Address, CHEMIST, 2, The Cedars, Putney, S.W.

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A GENUINE little ready-money RETAIL for sale. Good neighbourhood. Thickly populated, and no opposition. Doing £6 per week. Very little patents. No agents. Apply, by letter, to WALTER CROSS, 19 and 21, Queen Victoria St., E.C.

N.W.—A splendidly-fitted select Dispensing and Retail BUSINESS. Opened about 3 years. Solely under manager. Apply, BETA, care of Hodgkinson & Co., 198, Upper Whitecross St.

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EITHER in the suburbs or good provincial town, a BUSINESS, returning from £400 to £600, and capable of development. Must bear strictest investigation. CHEMIST, 9, Goldhawk Rd., Shepherd's Bush, W.

A LIGHT Retail and Dispensing BUSINESS. London or suburbs preferred. Returns from £600 to £900. Send particulars, and lowest price for cash, to Mr. PEARSON, 12, Alexandra Terr., Clifford Rd., Norwood Junction, Surrey.

A GOOD class Dispensing and light RETAIL in London or good suburb. Must bear strictest investigation. No agents. Apply, with full particulars, in confidence, to Mr. T. C. MARTIN, 36, Camden Sq., N.W.

A SMALL BUSINESS that can be worked up by young man, or larger one, where part of the purchase money can remain. Trial required. Address, CHEMIST, 58, Cedars Rd., Romford Rd., Essex.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

WEST OF ENGLAND.—A Dispensing BUSINESS. Returns £1000, at full prices. Price £900. Every investigation courted. Good residence, with garden.

HOME COUNTY.—Old-established ready-money Retail and DISPENSING. Returns £1000, at full prices. Low rental. Worth attention.

SURREY.—Retail and DISPENSING. Returns £700. Nett profit £300. Price about £500.

LONDON, N.W.—Good class Retail and DISPENSING. Good position. Increasing business. Price about £900.

LONDON, S.E.—Ready-money TRADE. Busy marketing spot. Returns £350. Price £260.

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VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

Valuations.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Probate and Fire Insurance valuations.

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Suffolk.—Good class light Retail, fair Dispensing, in pleasant market town. No heavy trade. Returns £750. Ample scope for Agricultural.

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Staffs.—Death vacancy. General Retail and Prescribing, with Wines. Returns, drug £675; wines £200. Price about £450.

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Western City.—Light Retail and Dispensing. Returns nearly £1200. Price about £950.

Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. Brett, Leicester.

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PREPARED BY

W. HOOPER

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Perfumes, No. 30

A correspondent writes:—"Your Perfumes, at 9s. per pint, are as good as I have hitherto paid 17s. 6d. per pound for."

FIFTY KINDS.

9s. for 20 ozs., carriage paid.

Samples of any kind for 2 stamps.

One Pint, post free, for 9s.

When buying, compare my Perfumes with other makers, and buy the best.

GEORGE DURRANT, Hertford.

London Depot—Messrs. BAISS BROS. & CO.

NOTICE.

Messrs. YOUNG & POSTANS'

Effervescing Granules

ARE NOW SUPPLIED BY

W. R. WHEELER,

Manufacturing Chemist,

25, WESTOW HILL, UPPER NORWOOD,

Who has purchased the sole right to manufacture and use their name in connection with the Granules.

November 12, 1887.

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MESSRS. ORRIDGE & CO., Chemists' Transfer Agents, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. Orridge & Co. has been known as a Transfer Agency in the advertising columns of the Pharmaceutical Journal since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

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3. Mid-Kent.—Very attractive locality. Good residential neighbourhood. Good class Business, Retail and Dispensing. Returns at present at the rate of £1000 yearly. Well-fitted shop and good stock. Price about £750, or valuation terms can be arranged. Worth attention.
4. Near London.—Ready-money Retail and Dispensing Business, situate in a good, thickly populated locality. Returns average over £1000 yearly, entirely by manager. Well-fitted shop and good stock. Good house, held on beneficial lease. About £1000 required.
5. Channel Islands.—Retail, Dispensing and General Business. Returns at present at the rate of £1600 yearly; increasing. Full prices are obtained. Net profits above the average. Good house, &c. Moderate rent. Price £950. References must be enclosed.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

ARMY CONTRACTS.

TENDERS will be received by 12 o'clock noon, on 28th November, 1887, for the supply of—

5,300 Field Dressings,

Sample of which can be seen, and forms of tender obtained, at the Royal Dockyard, Woolwich.

Forms of tender can also be obtained at this office.

Evan Colville Nepean,
Director of Army Contracts.

War Office, Pall Mall, S.W., *Nov.* 1887.

FLETCHERS'
Concentrated Liquors

Specimens of Recent Additions.

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ONE volume diluted with PROOF SPIRIT to *EIGHT* volumes forms
TINCT. CASCARILLÆ, B.P.

ONE volume diluted with DISTILLED WATER to *TEN* volumes forms
INF. CASCARILLÆ, B.P.

Liquor Ergotæ.

ONE volume diluted with PROOF SPIRIT to *EIGHT* volumes forms
TINCT. ERGOTÆ, B.P.

ONE volume diluted with DISTILLED WATER to *TWENTY* volumes forms
INF. ERGOTÆ, B.P.

Liquor Catechu.

ONE volume diluted with PROOF SPIRIT to *EIGHT* volumes forms
TINCT. CATECHU, B.P.

ONE volume diluted with DISTILLED WATER to *THIRTY* volumes forms
INF. CATECHU, B.P.

Liquor Jaborandi.

ONE volume diluted with PROOF SPIRIT to *FOUR* volumes forms
TINCT. JABORANDI, B.P.

ONE volume diluted with DISTILLED WATER to *TWENTY* volumes forms
INF. JABORANDI, B.P.

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TINCT. CHIRATÆ, B.P.

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ONE volume diluted with DISTILLED WATER to *EIGHTY* volumes forms
INF. QUASSIÆ, B.P.

Descriptive Pamphlet, with full detailed Price List, together with Trial Specimens, free on application to the Sole Manufacturers,

FLETCHER, FLETCHER & STEVENSON, Manufacturing Chemists, London. N.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 909.] SATURDAY, NOVEMBER 26, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.
RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

The next EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, December 14th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, December 7th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

ELECTION OF SIX ANNUITANTS

ON THE

BENEVOLENT FUND

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE.

A Meeting for the ELECTION of SIX ANNUITANTS on this Fund will take place on Friday next, the 2nd day of December, at 12 o'clock precisely.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

SCALE OF PENSIONS.

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of
Half-a-crown are entitled at each election of Annuitants to .. .. ONE Vote.
Five Shillings .. .. TWO Votes
Half-a-guinea .. .. FIVE Votes
One Guinea .. .. TEN Votes.
And to increase in the same proportion.

Five Guineas are entitled to .. .. FIVE Votes for life.
Ten Guineas.. .. .. TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-SIXTH SESSION, 1887—88.

COMMENCING OCTOBER 3rd, 1887.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.
Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

Professor WYNDHAM DUNSTAN.....CHEMISTRY.
Professor ATTFIELD .....PRACTICAL CHEMISTRY.
Professor GREEN .....BOTANY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.
Mr. HOLMES .....MATERIA MEDICA.

CHEMISTRY.

Lectures on Monday, Tuesday and Wednesday mornings, at 9 o'clock, comprising the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.
3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures. First Course, October to February. Second Course, March to July.

PRACTICAL CHEMISTRY.

Daily, at 10 o'clock, in the Laboratory, by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore enter for any period at any date. A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

BOTANY.

Lectures on Friday and Saturday mornings, at 9 o'clock, comprising the following subjects:—

1st Course.—Structural Botany, and the Physiology of the plant. October to February.

2nd Course.—Structural and Physiological Botany, but with especial reference to Practical Botany and the Classification of plants. March to July.

All the lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

MATERIA MEDICA.

Demonstrations in Vegetable and Animal Materia Medica every Thursday Morning, at 10. First Course from October to February; Second Course from March to July.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations every Tuesday, Thursday and Friday, at 5 p.m. First Course from October to February. Second Course from March to July.

Application for admission to the School, for Prospectuses, or for further information, may be made, personally or by letter, to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

THE PHARMACEUTICAL JOURNAL

Guaranteed Circulation of 7000 Copies Weekly.

(The LARGEST Issue of any Journal addressing Chemists and Druggists.)

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ASSISTANTS SEEKING ENGAGEMENTS *only* — Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.

*** *In these Advertisements, Two Initials or Two Figures count as one word.*

Advertisers are requested to observe:—

1.—That Advertisements are received by the Publishers not later than Ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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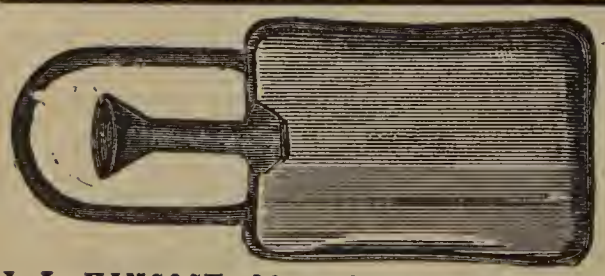

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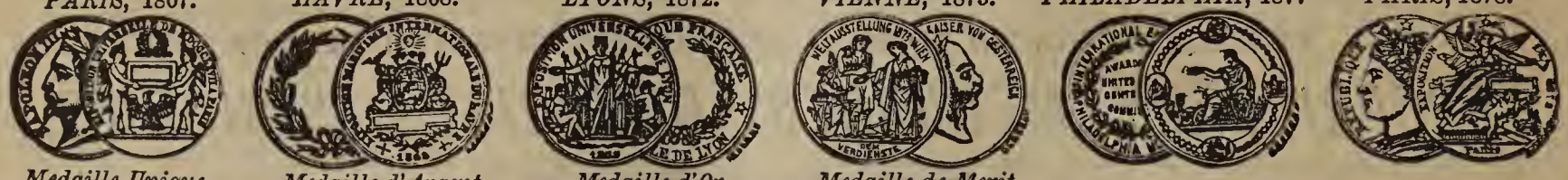

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Children's Bordered, per doz. 1/2
Ladies' ... ... „ 2/4½
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Ladies' ... ... per doz. 2/11½
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SAMPLES FREE.

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SEND FOR SAMPLES, FREE.

Fish Napkins, 2/11 per dozen. Dinner Napkins, 4/6 per dozen. Table Cloths, 2 yards square, 2/11; 2½ yards by 3 yards, 5/11 each. Kitchen Table Cloths, 11½d. each. Strong Huckaback Towels, 4/6 per doz. Frilled Linen Pillow Cases, from 11½d. each. Initials, &c., Woven and Embroidered. Samples and Illustrated Price Lists, post free to any part of the World. **ROBINSON & CLEAVER,**

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Super Quality Surgeons' Lint

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1s. 9d. per lb.

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No. 2 Hospital Lint,

1s. 6d. per lb.

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EXCEPTIONALLY GOOD QUALITY.

PRICE TO THE TRADE—

From 1/- to 6/- PER DOZEN, according to size.

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REDUCTION IN PRICE OF MUMFORD'S PURE CRUSHED LINSEED.

17/- per Cwt., Bags included.

28 and 56 lbs., **18/-** „ „ „
7 and 14 lbs., **20/-** „ „ „
And in 1 lb. Tins, **5**/- per doz., delivered free in London. No Oil Extracted. The finest article which can be produced.

STEAM MILLS, FARRINGDON ROAD, LONDON, E.C.

THE NEW DIETETIC EFFERVESCING

KEF. MILK DRINK. KEF.

The most easily assimilated Food in Wasting Diseases.

PREPARED AND DELIVERED DAILY BY THE SOLE MANUFACTURERS,

SPRING & CO., 21, BLENHEIM ROAD, N.W.

TRADE MARK: HEBE. TRADE MARK: HEBE.

"RAMORNIE." LIEBIG'S EXTRACT OF MEAT.

The only Brand supplied to the War Office.

7 lb. Tins ..... per lb.	5/11	..... each	41/5	4 oz. Jars ..... per lb.	6/7	..... per doz.	19/9
1 lb. Jars ..... „	6/2	..... per doz.	74/0	2 oz. Jars ..... „	7/0	..... „	10/6
½ lb. Jars ..... „	6/4	..... „	38/0	1 oz Jars ..... „	7/8	..... „	5/9

Write for Detailed Price List to the Australian Meat Co., 9 and 11, Fenchurch Avenue, E.C. 6 *lbs. Carriage Free.*

Brand & Co.'s PEPTONES OF BEEF, MUTTON, VEAL, AND CHICKEN.

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(REGISTERED)

A NOURISHING MEAT AND MALT WINE COMPOUND.

A stimulating tonic nutrient. Dose—¼ to 2 ounces twice daily.

In Bottles, 2s. 6d., 5s., and 7s. 6d.

Of all Chemists and Wine Merchants, and the Manufacturers,

HOOPER & COMPY., Chemists, &c.,

55, GROSVENOR ST., and 26, DAVIES ST., W.; also at 7, PALL MALL EAST, LONDON, S.W.

Laboratory—MITCHAM, SURREY.

S. MAW, SON & THOMPSON'S
CHEST PROTECTORS & VESTS
FOR SHIELDING THE LUNGS.

FIG. 3.
Double, for the Chest and Back.

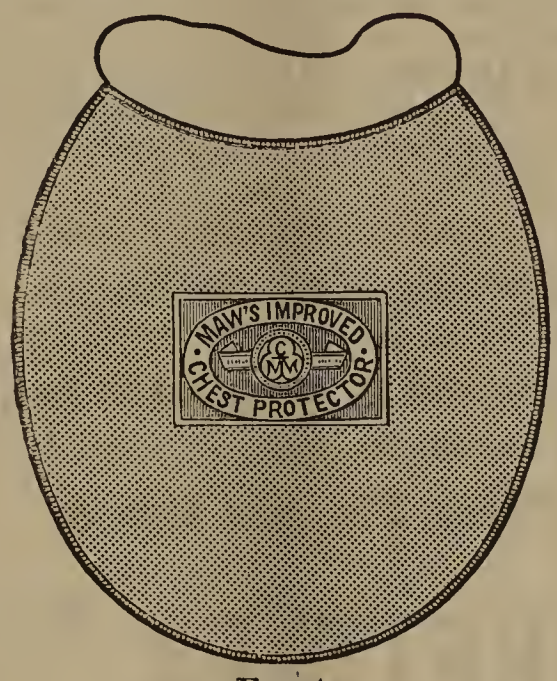


FIG. 4.
Single, Chest Protector.

FIG. 5.
Vest, a Shield for the Lungs.

CHAMOIS AND FLANNEL.

		No. 1.	No. 2.	No. 3.	No. 4
Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	,,	24/	32/	38/	46/
Fig. 4. Single	,,	9/	11/6	13/6	16/
Ditto, perforated	,,	11/	14/	16/	19/
Fig. 5. Vests ,,	,,	27/	34/	42/	51/

FELT, ASSORTED SCARLET AND WHITE.

		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Fig. 3. Double, best,	per doz.	17/	22/	27/	33/	44/
Ditto, second	,,	14/6	19/	23/	28/	37/
Fig. 4. Single, best	,,	7/6	9/6	11/	14/	20/
Ditto, second	,,	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet	,,	17/	22/	27/	33/	40/

Special quotations to Wholesale Buyers.

S. MAW, SON & THOMPSON, LONDON.

Something that has long been wanted.

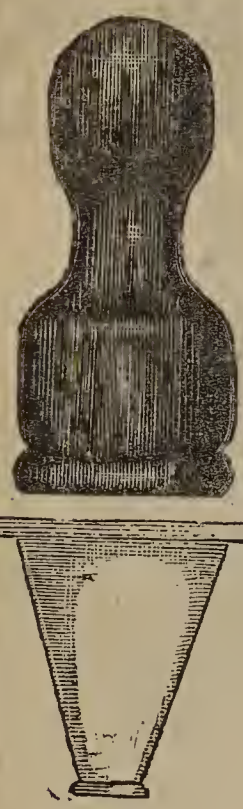


Fig. 1.

THE PATENT "MOTHER" TEAT AND UNION

The advantage of this over the old style of fitting is apparent. It is more easily kept clean, a more plentiful supply of food is provided for the infant, without so much effort as is required for drawing the food through the old Union and Teat. A soft india-rubber pad comes in contact with the infant's lips instead of the hard bone shield. The teat is more like the mother's nipple, and its shape will enable it to remain in the mouth without causing the child to relax its hold.

The Union will fit any Feeding Bottle Tubing.

Fig. 1 represents the Teat and Shield separate.
Fig. 2 represents the Teat and Shield united as in use.

The Teat is made of the best Black Rubber.
The Shield is made of the best China.

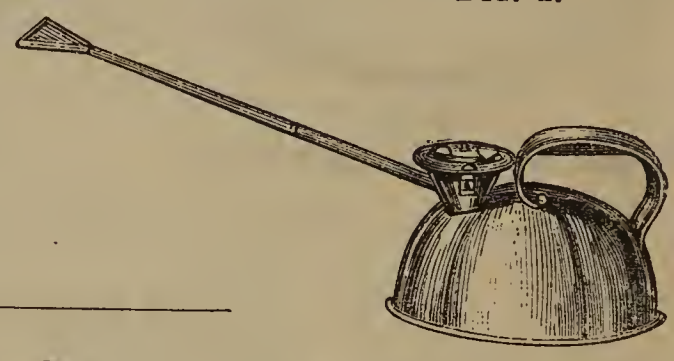
Price 27s. per Gross.

Fig. 2.

BRONCHITIS KETTLES

CHEAPEST IN THE MARKET.

21/- per dozen, Two Quart size; **30/-** per dozen, Three Quart size.



CHEST PROTECTORS. Best Red Felt.

No.	0	1	2	3	4	5	
Per dozen	6/-	7/6	9/6	11/6	14/-	20/-	SINGLE.
,,	14/-	17/-	22/6	28/-	34/-	45/-	DOUBLE.
,,	—	18/-	24/-	30/-	40/-	48/-	VESTS.

FOR ILLUSTRATIONS SEE OUR CATALOGUE.

RESPIRATORS.

To Retail at	1/-	1/6	2/-	3/-	4/-	5/-	6/-	7/6	10/6	each.
Per dozen	8/-	12/-	18/-	21/-	28/-	30/-	36/-	48/-	72/-	

Detailed Price List and Description on application.

Mahogany Counter Case free with a **40/-** assortment, or a Handsome Case with sloping front with **£5** worth.

All Respirators are priced so as to yield a good profit.

10 PER CENT. ALLOWED FOR CASH.

BOURNE, JOHNSON & LATIMER,

Wholesale and Export Sundriesmen,

34 and 35, FURNIVAL STREET, LONDON, E.C.

FURTHER OBSERVATIONS ON COMMERCIAL SACCHARIN.

BY W. A. H. NAYLOR.

In continuing my examination of saccharin, certain facts have been elucidated bearing more particularly upon the action of this substance on borax. Inasmuch as the manner of its behaviour in this connection involves the point at issue between Mr. Gravill and myself, I again ask permission to give publicity to some results which have recently been obtained by me. Permit me to request that in these notes Mr. Gravill will recognize an acknowledgment on my part of his letter, which appeared in the *Pharmaceutical Journal* for November 12. The question then is, What takes place when saccharin is added to an aqueous solution of borax? The answer was sought for by conducting a small series of experiments on the following lines. In 25 c.c. of distilled water 1·00 gram of borax in powder was dissolved and 0·60 gram of saccharin was added, which on agitation gave a clear solution, having a distinctly acid reaction. The solution was shaken up with ether, the latter removed, and cautiously evaporated. The treatment with ether was repeated until it withdrew from the aqueous solution traces of alkaline sulphates only. The several ethereal residues were united and washed with small quantities of water to free them from inorganic salts, and were finally purified by solution in ether. The residue left after evaporation consisted of colourless crystalline plates and needles, which were quite free from any sweet taste and were acid to blue litmus. They were sparingly soluble in cold water, but readily in alcohol, ether, chloroform and benzol; soluble also in solutions of the alkalies from which the free acid was precipitated on the addition of hydrochloric acid. They melted at 118·5° C., and sublimed without decomposition. An aqueous solution of the soda salt gave a reddish-yellow precipitate with a neutral solution of ferric chloride, but no turbidity with manganous sulphate solution. When the crystals were treated with a boiling solution of potassium ferridcyanide it gave on copious dilution with water the beautiful green colour which Mr. Gravill has described as characteristic of saccharin, but in this case the decomposition was unaccompanied by the elimination of hydrocyanic acid. Distilled with potassium bichromate and sulphuric acid they yielded no benzoic aldehyde. Their alcoholic solution when ignited in presence of borax showed a pronounced green colour along the margin of the flame. Now, without exception, these reactions are those of benzoic acid. Moreover, if we except the sweet taste, the crystalline appearance, the melting point, and the liberation of hydrocyanic acid by potassium ferridcyanide, they are also those of saccharin.

The aqueous portion from which the benzoic acid had been removed was found on examination to contain boric acid and the sulphates of ammonium and sodium. From its slightly sweet taste it possibly also contained some salt of saccharin.

My next inquiry was an attempt to determine if it were necessary that either the borax or the saccharin should be in excess in order to produce the reaction ascribed to boric acid. Two solutions were made, each containing both these substances, in one of which borax predominated and in the other saccharin. Both of them were found to give the green tinged flame accepted as evidence of boric acid

Further, let me affirm that I have been unable to obtain any proof of the formation of a double salt. Benzoic and boric acids appear to be formed concurrently.

The following equation symbolises the final products of decomposition as indicated by the experiments I have described:—

$$2\,C_7H_5O_3NS + 2\,NaBO_2, 2\,HBO_2 + 10\,H_2O = 2\,HC_7H_5O_2 + Na_2SO_4 + (NH_4)_2SO_4 + 4\,H_3BO_3.$$

CONTRIBUTION TO THE KNOWLEDGE OF THE COCA BASES.*

BY O. HESSE.

Almost simultaneously with the publication of my note on the alkaloids of coca leaves in the *Pharmaceutische Zeitung*, appeared a communication from W. C. Howard,† in which that chemist referred to the alleged non-existence of "amorphous cocaine," and at the same time gave a brief description of a base that he considered to be hygrine, though it was obviously nothing else than the "amorphous cocaine" in question, but probably in a state of incomplete purification. Howard separated this base from cocaine by means of the corresponding platinochloride, which he treated with a large quantity of water at a temperature of 80° C., and thus dissolved out the cocaine salt from the assumed hygrine salt, which remained undissolved. The base obtained from this salt was not entirely free from smell; it had an intensely bitter taste, formed an amorphous hydrochlorate, and the platinochloride contained from 18·48 to 18·6 per cent. of platinum. Howard is of opinion that this base contains three atoms of carbon more than cocaine, but he does not furnish any data to show that a carbon determination was made, and appears rather to have based that opinion upon the result of the platinum determination, overlooking the fact that this platinum salt contains about 5 per cent. of water. Probably this error has arisen from the circumstance that the air-dried cocaine platinochloride, being anhydrous, contains under the same conditions an amount of platinum corresponding to the formula—

$$(C_{17}H_{21}NO_4)_2PtCl_6H_2.$$

Howard found that the amount of platinum in the platinochloride of this so-called hygrine, which was undoubtedly a hydrated salt, was the same as that previously found by me in the same salt prepared from the amorphous portion of the coca bases.

	Howard.		Hesse.	
Pl. . .	18·48	18·6	18·26	18·44
H_2O . .	not determined		5·00	5·50

From these data alone it might be inferred that Howard's so-called hygrine was identical with the amorphous portion of the coca bases which I had prepared. So, likewise, the cocainoidine of Lyons and the cocaicine of Bender are in all probability in the main the same substance.

Since that time I have been engaged in the endeavour to prepare in a pure state the base of which these several products may consist to a greater or less extent, and by making use of broad-leaved coca I have succeeded in doing so without difficulty. After having with this object entirely separated the cocaine as hydrochlorate from the mixture of bases by a special process, the residual mixture, which was ascertained to be free from cocamine, was dis-

* From the *Pharmaceutische Zeitung*, Nov. 23.

† *Pharmaceutical Journal*, [3], vol. xviii., p. 71.

solved with dilute hydrochloric acid, and the solution mixed with ammonia in excess. The precipitate thus produced was separated from the mother-liquor and again dissolved with dilute hydrochloric acid and precipitated with ammonia, this operation being repeated until a portion of the precipitate gave with acids a solution which no longer showed any fluorescence when diluted with water, and was therefore quite free from actual hygrine.

The alkaloid thus purified was further washed with water at a temperature of 80° C., and was thus reduced to a melted mass, that was spread out upon glass plates and dried thoroughly at 60° C. In that condition when cold it could be detached in the form of transparent brittle laminæ, yielding a white powder that melted at about 51° C. In such a purified condition I call this alkaloid "cocaidine." Its composition is represented by the formula $C_{17}H_{21}NO_4$, yielding on analysis 67·2 per cent. carbon and 7·01 hydrogen, and it is therefore isomeric with cocaine and cocamine. It dissolves readily in ether, alcohol, acetone, chloroform, petroleum spirit, or benzene, but scarcely at all in water, ammonia solution, or caustic soda; it has an alkaline reaction, but does not alter phenolphthalein. At first it appears to be tasteless, but gradually develops, after a rapidly disappearing sense of numbness in the tongue, a bitter taste. A chloroform solution gives in the polariscope with $p=4$ and $t=20°$ C. $(\alpha)_D = -20·6$, so that it turns the plane of polarized light rather more strongly to the left than cocaine does.

Cocaidine, when perfectly dried, attracts water from the atmosphere and then cakes together. It is free from odour and does not volatilize with water vapour. When boiled with an alcoholic solution of baryta it splits up, yielding benzoic acid, but what other product is then formed has not yet been ascertained.

Cocaidine hydrochlorate has the form of an almost colourless varnish, readily soluble in water or alcohol, and but slightly hygroscopic. It is without smell, tastes intensely bitter, and does not appear to produce irritation of the mucous membrane. The platinochloride has a composition represented by the formula—

$$(C_{17}H_{21}NO_4)_2PtCl_6H_2 + 3H_2O.$$

As regards hygrine, the statements of Lossen in reference to it are somewhat ambiguous, inasmuch as it appears that in part they apply to the substance obtained directly from the coca leaves that would have still contained cocaidine, and in part, also, to the product obtained from it by distillation with water. So much, however, is certain, that hygrine is a liquid as the name indicates, and that it is capable of being distilled with water vapour.

Since cocaine, cocaidine and cocamine are neither of them volatilizable when boiled with water, nor capable of yielding volatile bases by such treatment, these circumstances would point to a possible mode by which hygrine could be obtained if it were present. My observations in this respect are in complete accord with those of Stockman and Howard, according to whom the "crude amorphous cocaine" yields, when subjected to distillation with water, small quantities of an oily basic substance. The mother-liquor obtained as a bye-product in the purification of cocaidine is the most suitable source from which this oily base may be prepared. This liquid is mixed with some caustic soda and shaken out with ether, the ether solution evaporated, and the residue distilled with water to drive over the hygrine. The distillate is mixed with hydrochloric acid in slight excess, evaporated to dryness, and the hygrine separated from the residue by shaking with caustic soda and ether. The brown oily residue obtained on evaporating the ether is treated with dilute acetic acid, which separates a dark brown smeary mass, and the perfectly clear filtered solution is mixed with excess of caustic soda and shaken out with ether.

The hygrine left on evaporating the ether solution obtained in the last operation is a yellowish oily substance of peculiar odour, somewhat suggestive of that of chinoline; it has a strong alkaline reaction upon red litmus paper, does not alter phenolphthalein, has a slight burning taste, dissolves readily in ether, chloroform, or alcohol, but little in water or caustic soda solution, and forms a crystallizable salt with hydrochloric acid. A water solution of the hydrochlorate becomes milky on addition of caustic soda, owing to the separation of the base in minute oily globules which aggregate after a time. The base forms with oxalic acid a salt crystallizing in small needles. The platinum salt is also crystallizable.

The fluorescence of solutions of hygrine in dilute acid is a marked character, but it becomes apparent only on dilution with water, and is not recognizable when the solutions are concentrated. The fluorescence is also destroyed by other substances, such, for instance, as sodium chloride.

Hygrine volatilizes with water vapour, and at a higher temperature it may be distilled alone. The quantity at my disposal was too small to admit of a determination of the precise boiling point. To ascertain the composition of the base the platinum salt was analysed and found to give—

						Calculated.
Pt	24·51	25·02	24·25	2·25	24·18	24·71
C	—	36·59	—	—	36·80	36·59
H	—	4·05	—	—	3·94	3·55
Water of crystallization	4·73	4·51	4·35	5·15	—	4·57

These data lead to the formula—

$$(C_{12}H_{13}N)_2PtCl_6H_2 + 2H_2O$$

and show that hygrine is a homologue of chinoline, C_9H_7N, having the same composition as tetrahirolene of Greville Williams, but whether or not it be identical with that substance must be left for further inquiry to determine.

Wöhler and Lossen state that the substance to which they gave the name of hygrine had a distinct smell of trimethylamine, and several other observers have repeatedly remarked the odour of that base in the preparation of cocaine. It is therefore very possible that hygrine may be really trimethylchinoline, and that this base is convertible under certain conditions into trimethylamine and a non-nitrogenous substance, as is the case for example with dimethylpiperidine methylhydroxide. This, however, is only a speculation that must be submitted to the test of experiment.

[*** The foregoing paper is both interesting and important as furnishing additional evidence in support of the opinion already expressed in this Journal, that cocaine is naturally associated with another alkaloid of different characters, which requires to be separated in preparing cocaine salts for medicinal use.—Ed. Pharm. Journal.]

RONCEGNO AS A HEALTH RESORT.*

When Professor Seegen and Dr. London told me at Carlsbad that the mineral water of Roncegno was one of the most remarkable with which they were acquainted, owing to the large quantity of arsenic contained in it, I made some inquiries about the place where this mineral water was produced. I found it no easy matter to obtain the desired information. I turned, but without success, to the last editions of 'Murray' and 'Baedeker' and the 'Continental Bradshaw,' to Dr. Macpherson's 'Baths and Wells of Europe,' and Dr. Burney Yeo's 'Climate and Health Resorts,' the place not even being named in any of them. I found it named in 'Bradshaw's Dictionary of Mineral Waters and Health Resorts,' and stated to be in Italy. In the map appended I found all the places mentioned in the text except Roncegno, and it was almost by accident that I learnt that it was about twenty miles from Trent on the road to Venice, and that it was not in Italy, but in the Austrian Tyrol. Had the place been recently discovered and little frequented I should not feel surprise at the difficulty of procuring particulars about it. But it has been known as a watering place for nearly thirty years, and upwards of 1000 invalids have visited and spent several weeks at it in one year.

Roncegno is situated in the valley of the Brenta, at the foot of Mount Tesobo, and at an elevation of 1700 feet above the level of the sea. High up on the mountain slope, at a time of which the exact date is unknown, mining was pursued, the mineral extracted from the ground being arsenical pyrites. In 1875 the mine was rediscovered, or at least was explored, and it was found to be of considerable extent. A central rail had been laid in the principal level, and a small wagon which ran upon it was found where the old miners had left it. The visitors to Roncegno are in the habit of visiting this old mine, the sight being a curious one. The mine proves that the fact of the mountains in this region abounding in minerals was well known to the inhabitants of the valleys and mountain slopes in the olden days, probably when the Romans were the lords of the country.

About thirty years ago the mineral water of Roncegno was discovered as the result of the observation of some peasants. They saw a golden-yellow liquid dripping from a fissure in the rock, and they observed that where it fell nothing would grow. What they saw became the subject of general talk, and Dr. Paoli, holding a post almost corresponding to that of an English parish doctor, was induced by what he heard to examine the strange fluid. He soon learnt that it was a strong mineral water, and that it was very rich in iron. He tried the effect of prescribing baths in it to patients—those suffering from debility and "pellagra," a malady which is common in these valleys and in all the southern regions where polenta is the principal food of the people. As the results were remarkable and satisfactory, Dr. Paoli communicated them to his colleagues. Arrangements were made with a view to the treatment being pursued in a more systematic way than in the house of each patient. A disused silk factory was converted into a bath-house, and the number of patients frequenting it soon became in excess of the accommodation. In 1860 a joint-stock company was formed, and a larger and better-arranged bath-house was constructed, but soon after it was found that the twenty baths in the new building were insufficient to meet the demand. Two other companies were successively formed to provide the capital required for building the present "Curhaus," in which there are rooms to accommodate about 150 visitors and baths for all those who are likely to need them. The grounds surrounding the "Curhaus" have been laid out and embellished, the roads have been improved, regular postal communication has been secured, and during the season a telegraph office is open in the main building. A few years ago the entire property passed into the hands of the Brothers Waiz, of Gradisca, who have spared no pains or expense to make it attractive. Indeed, I was surprised to find so large and well-arranged a building as the "Curhaus" at a place of which the name is not contained in guide-books or to be found in the most recent maps. In addition to the accommodation supplied by the proprietors of the "Curhaus," the visitor has the choice of rooms in five hotels in the village of Roncegno.

Before proceeding to describe this place in greater detail I may anticipate a question which will doubtless be on the lips of those who have read thus far—How comes it that a place of which there is no mention in the most popular guide-books should be largely frequented by invalids and be one well worth a visit by those who journey for change of scene? The simple answer is that many medical men of Austria and Northern Italy are well informed about Roncegno and its waters and are in the habit of prescribing a course of the waters to their patients. Dr. Goldwurm, who has been the resident physician at the "Curhaus" in Roncegno for several years, has written a work on the subject which is included in the series of medical treatises on mineral baths and watering-places published by Herr Wilhelm Braumüller, of Vienna. In addition to this work, I have before me six treatises in Italian on the subject of Roncegno's baths and water, the first being dated 1873, and containing a chemical analysis of the mineral water, the last being dated 1884, and giving a description of the place itself and particulars of cures wrought there. Such is the explanation of what at first sight seemed a puzzle.

It is as well, perhaps, that the frequenters of Roncegno are sent there by their medical advisers, and are under medical supervision during their stay. The water is a potent medicine. At first it was used for bathing purposes only; now, however, the patient is ordered to drink as well as to bathe in it. As the dose is not more than two tablespoonfuls a day, diluted with plain water, it is clear that the water is far more powerful than the mineral waters which are drunk in large quantities. Those who drink too much Roncegno water at one time, or continue taking it for too long a period, are soon made conscious of their error by suffering from oppression in the region of the stomach, loss of appetite, diarrhœa, smarting and twitching of the eyes. Dr. Goldwurm complains that many patients leave the place after a three weeks' sojourn, their belief being that they ought to be cured then if the water be really efficacious. It is very sensibly remarked by him that, if an old and a young man suffer from the same malady, the treatment required in the case of the younger patient might be much shorter than in that of the elder. What Dr. Goldwurm protests against with emphasis, in common with his countrymen and colleagues who practise at a watering place, is the impropriety of a patient who has been benefited by the treatment giving advice to others. At all Continental watering places a strong desire prevails to dispense with the services of medical men, and the medical men naturally disapprove every man acting as his own doctor. Every precaution is taken at Roncegno to prevent self-doctoring. Before a patient can begin a course of baths he or she is obliged to consult the resident physician. It is found easier, however, to enforce a medical consultation than to insure that the advice given will be followed. This is exemplified in Dr. Goldwurm's complaint that all patients think they may leave the place at the end of three weeks.

The mineral water of Roncegno, as I have already said, being powerful in its action, the dose is small. Dr. Goldwurm is very particular as regards the way in which the dose is taken. If it should not exceed two tablespoonfuls it may be drunk off at a draught; but if double that quantity be prescribed then the patient is to sip the

* Extract from a series of articles on "Austrian Health Resorts" in the *Times*.

water. Those patients to whom the iron in the water will prove beneficial are ordered to drink it early on an empty stomach, and to walk some time before eating; those, on the other hand, who take it on account of the arsenic are to do so immediately before breakfast, and then, after walking about for a time and taking a light repast, they are ready for bathing in the water. Patients are warned against smoking, reading and sleeping when in the bath, and they are recommended to keep moving and rubbing themselves while in the water. It is noteworthy how careful the physicians at watering places on the Continent are about their patients, and how minute they are in directing them what to do and what to avoid. A German and a French doctor resemble a German and a French policeman in thinking that human beings are sure to go wrong unless they are kept in the right path by the heavy hand of authority. Great differences of opinion prevail as to whether a patient at Roncegno should bathe twice in the same day. This appears to be a problem resembling that which divided the Big-endians from the Little-endians in the kingdom of Lilliput. In general, one bath daily is accounted enough, but in particular cases two may be beneficial.

I am the more disposed to regard Roncegno water with favour because it is not said to be a universal cure, Many mineral waters are lauded as highly as if they proceeded direct from the fabled fountain of perpetual youth, for which the early visitors to the New World sought with such eagerness, and sought in vain. Owing to being over-praised, these waters are classed by many persons in the category of quack medicines. None of the medical writers about Roncegno water profess that it will work miracles, but each of them maintains that its virtues are strikingly manifested when employed—first, in cases of anæmia, with its many and varied consequences; second, in many skin diseases; third, in malarial and intermittent fevers; fourth, in muscular rheumatism and inflammation of the joints; fifth, in chronic bronchial catarrh and incipient phthisis; and generally in all cases of exhaustion following a long illness. As this water is so little known it may be useful to reproduce the analysis of its contents which was made by Professor Manetti of the University of Pavia, showing how many parts of the several constituents are contained in ten thousand parts of water:—

Arsenic acid	0·670
Ferric oxide	20·400
Sulphuric acid in combination	20·390
Sulphate of ferrous oxide	3·840
Sulphate of cupric oxide	0·270
Sulphate of manganese	1·420
Sulphate of ammonium	0·054
Sulphate of aluminium	12·790
Sulphate of magnesium	5·963
Sulphate of calcium	8·300
Sulphate of potassium	7·500
Chloride of sodium	0·422
Carbonic acid	0·049
Silica	2·910
Organic matter	16·300
	101·278

The existence of a large proportion of arsenic is the distinguishing characteristic of Roncegno water, and its pre-eminence in this respect is apparent when it is compared with other mineral waters in which arsenic is found. Of these, La Bourboule, in Auvergne, is the most noteworthy. While there are twenty-eight milligrammes of arseniate of soda in every litre of La Bourboule water, a corresponding quantity of Roncegno water contains sixty-seven, or nearly three times as much. Dr. Weiss, of the University of Padua, who has written a pamphlet on the character and curative effect of the Roncegno water, maintains that many of the good results obtained from its use are due to the presence not only of arsenic, but also of manganese and iron in combination with it. I have already said that the dose taken is not large, being from one or two tablespoonfuls daily; I may now add that the taste is not unpleasant when that quantity is diluted with water. When a bath is prescribed from one-fourth to one-third of mineral is added to the plain water. I took a bath, but did not find the sensation of a marked kind.

Besides patients drinking and bathing in the mineral water at Roncegno they have another curative medium there in the form of a mud bath. But this bath differs in nearly all respects from the so-called mud baths at German and Austrian watering places. The name is misleading, because the substance employed cannot accurately be termed "mud." At Carlsbad, Marienbad, and other places the substance which is loosely designated "mud" is really a mineralized peat or turf. At Roncegno the "mud" closely resembles yellow ochre. It is a deposit or sediment obtained from the tanks wherein the mineral water is stored. When steam is applied for a time it becomes semi-liquid, and in this form it is applied to the afflicted part of the human body. In peat or moor baths the patient is surrounded by the substance, just as in a bath of water; but this mud bath is applied locally, much in the same way as a poultice. The mud poultice is said to be powerful in its effects, pimples soon covering the spot on which it has been placed. This application is considered by Dr. Goldwurm to be very useful in cases of muscular rheumatism and chronic arthritis, in white swellings and sciatica. He states also that the eruption which appears when it is used does not do harm and quickly disappears. For other maladies a variety of baths are provided, such as hot air, vapour and douche baths; while there is a room set apart for inhaling the water in the form of spray, a mode of application which produces good results in diseases of the throat and air passages.

Patients who take up their abode in the Curhaus at Roncegno not only get medical advice, mineral water, and baths under its roof, but they are also housed in comfort and fed abundantly. The proprietors hold out as an inducement to visitors that the food is well cooked and served without stint, "each dish being handed round more than once." I can confirm this statement, yet I must add that the fare is plain, and that the cooking is half Austrian and half Italian. A light and palatable red wine of the country is served at the table.

For beauty of scenery and situation few spots outvie Roncegno, yet it is not to be recommended to those who merely wish to pass a pleasant holiday. The visitor who is not ailing is out of his element here. Those who enjoy it the most are those who may be said to mean business—in other words, they must visit it for what is styled "the cure." I cannot think that such persons will have any reason to complain of their accommodation and entertainment. They may find the life dull, the only relaxation being taking walks between baths and meals. The physicians of Germany and Austria study the characters of the several watering places as much as they do the nature and operation of certain drugs, and thus they are enabled to order a patient to go to any one of these watering places with as well-founded confidence as they write a prescription for a remedy. Judging from the information which I have collected, I think that English physicians would do well to inform themselves about Roncegno and its arsenico-ferruginous water. Unless I err greatly it seems clear that this water will act with remarkable benefit in all those maladies for which the mineral waters of Auvergne are in repute, and may even prove curative in many cases where the water of La Bourboule has failed to give relief.

The climate at Roncegno during the summer months is temperate and equable. The season begins in May and closes at the middle of September. Lofty mountains shelter Roncegno from the north.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 26, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

APPRENTICESHIP IN PHARMACY.

IN resuming the consideration of the subject of apprenticeship in pharmacy, it may without exaggeration be said that there are not now many places where apprentices are really taught that which is essential to the proper performance of their chief social duty, or even directed how to seek for the information themselves. It may be doubted if any pharmacist makes all the official preparations that he needs and dispenses; but, so far as the pupil's special pharmaceutical education is concerned, it is sufficient if most of these be home-made, and that he has the opportunity of actually seeing and taking part in all typical processes. It is not enough that he be given the Pharmacopœia, and told to set on a certain quantity of some tincture or decoction, or to mix a pill-mass or ointment. A common failing of humanity will incline him under such conditions to seek what appears to be the easiest method of working, and unless it be impressed upon him that all the minutiæ in the official processes are not primarily devised to cause him inconvenience, but are absolutely essential to the complete success of his labours, it should be apparent to anyone that the apprentice will be liable to act carelessly, and, at best, fail to derive any lasting benefit from his task. In fact, a knowledge of pharmaceutical physics must be inculcated, so that each new process attempted, and every preparation made, will impress upon the pupil the principles of his art, whilst these in turn will render new facts easy of acquirement. At the same time it should be borne in mind that the methods of testing the quality of raw materials used, and estimating the strengths of products, form an integral part of a correct course of training in practical pharmacy.

Then, when sufficient advance has been made, a rational system of dispensing medicines should be taught. It is not sufficient to allow the pupil, towards the end of his term, to compound any or all of the prescriptions that may be brought by customers. Some classes of medicaments may never be met with in provincial towns or small pharmacies, and it is imperative that he should be as familiar with these as with more common ones. Let types of the difficult emulsions, pills and mixtures be placed before him, and a stated time be allowed during which he may practise. The cost need not be excessive, and it should be remembered that he has paid for instruction, either by a premium, or by working for small, or no wages. Such a course of training is absolutely necessary for the turning out of true practical pharmacists, and, in so far as apprenticeship falls short of this, a great wrong is done to the apprentices directly and the public indirectly. What passes as training in shops where everything is bought that is likely to need time or trouble in preparing it is not worth consideration, even as an apology for a real training. The proprietors of such have no moral right to take apprentices. If such an one attempt to defend his conduct by saying that he teaches his art as he himself practises it—his art "which he useth by the best means that he can"—he but brands himself with incompetency, and the excuse will not suffice him, for, by implication, the indenture clause gives him credit for having thoroughly learnt his art himself so far as lay in his power, and for having since kept pace with the progress of pharmaceutical knowledge. It may be that he will assert that the fact of his drugs, chemicals, and galenicals being bought from first-class wholesale houses is a sufficient guarantee of their quality, whilst the last are better made in large quantities, and are certainly cheaper to buy; that his business requirements are not such as will justify him in sparing time and incurring expense to teach pharmacopœial testing; that his share of dispensing practice is disproportionately small, and that he cannot, therefore, be expected to turn out qualified dispensers. But all this avails him nothing in the face of the fact that he has taken a youth as apprentice, guaranteed to teach him his art, and failed to do so.

Unfortunately, moral suasion fails to effect its object in such cases as this, and we are left to cast about for some other method of bringing about the desired end. In the first place it must be confessed that the old system of apprenticeship is dead. It cannot be resuscitated under modern conditions. Under the old trades-guilds restrictions it flourished and was admirably suited to its purpose. It was part and parcel of the wider system under which all commercial pursuits were confined to a favoured few. Protected from excessive rivalry, each member of the guild was doubtless proficient in all the branches of his art, whilst he enjoyed full scope for practising and teaching it in its entirety. Now all this is altered; free competition has favoured differentiation, and the division of labour proceeds further every year. Though a pharmacist gain a thorough general grounding in his business, he finds himself compelled to practise some special branch of it, to the partial or total neglect of the rest, and even with the best intentions will find it difficult if not impossible to give a complete all-round practical training to those who come to

him for instruction. The cost, too, of such preparation could never be adequately met, for whereas under the old plan the master was guarding his own interests by preventing anyone opposing him, except he had served his full time, and also by requiring from those he employed a guarantee that they would not commence business anywhere near him, his modern representative is conscious that each new pupil may prove a possible rival, and that the more he teaches him the more dangerous his opposition is likely to be, whilst the youth or his guardians would most certainly not consent to pay what might be considered a just sum in return for close personal attention, seeing that the chances of the business are now so uncertain, and hopes of great successes frail.

But the technical education must be given somehow, and in a more satisfactory fashion than is now generally current. Hence the question arises, how well-intentioned pharmacists may best fulfil the task with the least amount of inconvenience to themselves, the greatest advantage to their pupils, and the most lasting benefit to pharmacy and the outside world. In addition to this some means should be considered whereby the evils arising from the malpractices of their short-sighted brethren may be nullified or at least minimised.

MICHEL-EUGENE CHEVREUL.

Last year it was the privilege of the French nation to felicitate the eminent *savant* Michel-Eugène Chevreul upon completing the one hundredth year of his life and the eightieth year of his career as a contributor to the advancement of scientific knowledge. This was done by several representative bodies, including among others the Academy of Sciences, of which he had been a member for sixty years, and the National Society of Agriculture of France, over which he had presided for thirty-seven years. One of the most interesting of the ceremonies took place in the hall of the latter Society, on August 30, the eve of his birthday, when copies of a medal, representing the homage especially of the younger race of investigators, were offered on behalf of "la jeunesse française au doyen des étudiants." As a memento of this presentation the organizing committee has just furnished every subscriber with a printed *compte rendu* of the proceedings at the celebration, illustrated with a photogravure of the medal; and, as this did not exhaust the funds subscribed, it has been supplemented by a very complete list of the writings of M. Chevreul, which is preceded by a portrait of the veteran chemist, printed from a very beautifully executed etching by Champollion. Even the most superficial glance at this bibliography raises a feeling of wonder, not only at the number of the memoirs, which exceeds five hundred, but at the wide range and the importance of the subjects dealt with. The list commences with a paper written in 1806 on a Chemical Examination of Fossil Bones found in the Department of Eure-et-Loire. Very soon after the attention of Chevreul was turned to the subject of colouring matters, with which his name will long be associated, the dye woods and indigo yielding materials for several of his earlier papers. Between 1813 and 1823 he published his series of memoirs upon the fats, which let in a flood of light upon their chemical history and revolutionized the industries of soap and candle making. In 1832, while occupied in examining preparations of meat, he discovered creatinine. Two years afterwards he commenced the publication of a series of important memoirs on dyeing. In fact up to the completion of his centenary there was no cessation to his chemical and literary activity, the subjects ranging through the domain of inorganic and organic chemistry, from the profundities of chemical philosophy to the divining rod and the turning of tables. It affords a glimpse at some of Chevreul's contemporaries to find that he pronounced discourses at the obsequies of Serrulas (1832), L. de Jussieu (1836), Dulong (1838), Robiquet (1840), Audouin (1841), Geoffroy (1844), A. Brogniart (1847), Ebelmen (1852), and Gratiolet (1865). The information given in the catalogue is as a rule limited to the title and date and place of publication, together with a brief synopsis of the more important works, the only exception being made in favour of some correspondence that had its origin in the unhappy circumstances attending the siege of Paris in 1871, which is printed in full. This emphasizing of unpleasant memories seems somewhat out of place within a few pages of the addresses in which the Academies of Berlin, Munich and Gött ngen bear testimony as to the generous admiration German scientific men have for their French *confrère*.

On Friday next, Dec. 2, at noon, a meeting will be held at 17, Bloomsbury Square, for the election of Six Annuitants on the Benevolent Fund of the Pharmaceutical Society. For persons interested in any of the candidates it may be useful to state that subscriptions and donations paid on or before that day will entitle the givers to vote at the election. We are requested by the Secretary to mention, that among the donations recently received a traveller who has been calling on chemists for a quarter of a century has sent a contribution of five guineas, and thinks a knowledge of this fact might induce some other of his brethren who have not done so to make a donation to the Fund.

* * *

We learn from the *Overland China Mail* that Mr. W. E. Crow, Government Apothecary and Analyst at Hongkong, has been appointed Acting Sanitary Inspector and also as Lecturer on Chemistry in the new Medical College recently inaugurated at Hongkong. Mr. Crow was formerly a Bell Scholar in the Society's School of Pharmacy, and is a joint author of the articles on Chinese

Materia Medica in course of publication in this Journal. Another former pupil in the Society's School, Mr. Malcolm Watson, has been appointed Assistant Apothecary in the Government Civil Hospital, Hongkong.

* * *

The Pharmaceutical Society of New South Wales has adopted a novel device for obviating the inconvenience sometimes imposed upon pharmaceutical students in the colony by the necessity of travelling long distances to attend the Preliminary examination. In future whenever the candidate resides more than seventy miles from Sydney the police magistrate of the district is to be asked whether he will undertake to superintend the examination and return the examination papers, with the answers, to the Society in Sydney.

* * *

The *Australian Journal of Pharmacy* records a fatality attending the prescribing and dispensing of an incompatible mixture. The prescription ordered —"Potass. Chloratis, ℈ij.; Syr. Ferri Iodidi, ℥iv.; Syr. Simplicis, ℥iv.; Sp. Chloroformi, ♏xx.; Aquae ad ℥ij. M." The mixture, when dispensed, was of a light-brown colour, which gradually darkened, and in a few hours iodine was deposited in abundance. In this condition the mixture was administered to a child, eventually causing death. The prescriber condemned the dispensing of the mixture, which he said should have been an almost colourless mixture, and held the dispenser to be liable for the consequences. But an expert to whom the subject was referred failed, after various trials, to prepare a presentable mixture. In his report, however, he expressed the opinion that if the prescriber could not have been consulted with, and advised to omit the potassium chlorate or to adopt some other mode of administration, the prescription ought not to have been dispensed.

* * *

It may be interesting to mention as an illustration of the progress of science in the far East that the first part has been received of "Communications from the Medical Faculty of the Imperial University of Japan." The papers in this part are on purely medical subjects and are all written in the German language, though communications in French and English are expected to appear in future numbers. The book, which is published in Tokio, is in quarto and handsomely got up, the printing and engraving being of a quality that would do credit to any European firm.

* * *

We are pleased to be able to state that Mr. William Mount, pharmaceutical chemist, has been elected Mayor of Canterbury, and Mr. Daniel Amos, pharmaceutical chemist, has been made a magistrate of the same city.

* * *

The next meeting of the Chemical Society will be held on December 1, when there will be a ballot for the election of Fellows, and the following papers will be read :—"The Alleged Existence of a Second Nitroethane," by Professor Dunstan and T. S. Dymond; "An Extension of Mendeleeff's Theory of Solution," by Holland Crompton; "Note on Electrolytic Conduction, and on Evidence of a Change in the Constitution of Water," by Professor Armstrong, and "Researches on the Laws of Substitution in the Naphthalene Series," by Professor Armstrong.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

Meeting of Executive.

A meeting of the Executive of the North British Branch was held in the Society's house, 36, York Place, Edinburgh, on Wednesday, November 16, at 3.30 p.m.

Present—Messrs. Ainslie, Baildon, Boa, Gilmour, Mackay, Mackenzie and Stephenson, Edinburgh; Frazer and Kinninmont, Glasgow; Hardie, Dundee; Maben, Hawick; Nesbit, Portobello; Paterson and Strachan, Aberdeen; Storrar, Kirkcaldy; and Watt, Haddington.

An apology for absence was received from Mr. Gibson, Leven.

The minutes of last meeting were read and approved.

The report of the General Purposes Committee was read and adopted.

The Assistant Secretary reported as to the attendance at the Society's house and circulation of books from the Library.

Some discussion took place as to the admission of students to the Museum, and it was ultimately agreed to refer further consideration of the subject to the General Purposes Committee.

Mr. Mackenzie moved, Mr. Ainslie seconded, and it was unanimously resolved, that the present members of the Board of Examiners for Scotland be renominated for 1888.

The Executive then considered the motion passed at the general meeting in July as to the publication of proceedings.

After full discussion, the Chairman moved the following resolution, which was seconded by Mr. Stephenson, and unanimously adopted :—

"That a report be sent to the *Pharmaceutical Journal*, and that meetings of Executive be open to reporters for the trade journals."

A letter was read from James Christison, W.S., offering to present engravings of Dr. Pereira and Jacob Bell.

It was agreed to accept the donation and send a letter of thanks to the donor.

The meeting then closed.

EVENING MEETING IN EDINBURGH.

The first evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, November 16, at 8.30. Mr. H. Bellyse Baildon, B.A., F.R.S.E., in the chair.

The minutes of the last meeting having been read and approved,

The Chairman said he was very happy to welcome them at the beginning of another session of their evening meetings. He thought they might congratulate themselves that they had started the session in good time, and under extremely happy auspices. Instead of having anything in the least nature polemical, or anything touching any sore place in pharmaceutical politics, they were to have a purely scientific address from their distinguished friend Professor Crum Brown. The more clearly they could show that they were in earnest in the pursuit of knowledge and scientific attainment the better they would stand with the whole public, and nothing hardly could contribute more in that direction than securing the assistance and the services of a man like Professor Crum Brown, who was well known to all of them.

Inaugural Sessional Address.

BY PROFESSOR A. CRUM BROWN.

Remarks on some Chemical Theories.—Man is a theorising animal. We instinctively look for relations among the phenomena we observe. We seek and expect to find order and regularity in nature. But we go further; not

satisfied with observed (real or apparent) regularity, we try to find a real, or we invent an imaginary cause of the phenomena, so that we may account for their regularity by the identity or similarity of their causes. A theory is felt to be satisfactory in so far as the consequences which would follow, were it true, agree with what we actually observe in nature. The stringency of this test of the satisfactoriness of a theory, depends on at least three things. 1st. The precision with which we can reason out the consequences to be looked for were the theory true. 2nd. The accuracy of our observation of the actual facts of nature. And 3rd. The degree of resemblance between the consequences and the facts which we shall consider agreement. In all of these points we become, as a science advances, more and more strict, so that the test of a theory becomes more and more severe. A theory, once propounded, demands investigation. Not only must we see that its conclusions agree with already known facts, but we seek out hitherto undiscovered facts and compare these with the conclusions of the theory. And the theory itself helps us to do this, for as soon as the theory is stated, we see conclusions derivable from it which have no known facts corresponding to them. The theory shows us where to look, we look and find facts which either confirm or disprove the theory. If they confirm, the theory gains credit, and also, as a rule, fulness, for in most cases these newly discovered facts show us that the theory may be more satisfactorily stated, that is, stated in a way agreeing better both with the old and with the new facts. And so the theory grows in credit, in fulness and in usefulness. But after a longer or shorter, a more or less useful life, a theory wears out. New lines of investigation lead to a knowledge of facts which do not fit easily into the old system. More accurate survey of the old facts brings out previously unnoticed discrepancies, and it becomes plain that the theory is drawing to its close. A tough old theory sometimes lasts a long time in such a state of senility. Supported by subsidiary hypotheses, proofs of weakness, rather than sources of strength, it is tolerated because there is nothing to take its place. At last its successor appears, and the old theory passes away, regretted chiefly by those who do not very well see how they are to accommodate themselves to the new regime. A few such fond adherents may refuse to recognize the fact that it is dead, but the life and progress of the science is with the newcomer. Such is a rough sketch of—I had nearly said—*every* theory. But we have theories with us now, active, useful, with no signs of decay about them. And so we have men among us, active, useful, with no apparent signs of decay; but what has happened to our predecessors will happen to us. Have we, then, no means of proving the truth of a theory? No, we have none. But we have what is much more to the purpose, we have the means of testing the usefulness of it. A perfectly useless theory, one which leads to no new discoveries, which opens out no new lines of investigation or speculation, has no interest for any one: nobody cares whether it is true or not; just as nobody, except those who have to feed him, cares how long a perfectly useless man lives.

We all know our duty—though we do not always act as if we did—to use our life while we have it, and so we should use our theories, while they live. Let us get all the work we can out of them, and when they are done we may be sure we shall get new ones.

What are we to do with these old theories? We cannot use them. Are we then to despise them and laugh at those who worked with them? What do we do with the old cross-bows and flint-locks, with the spinning wheels and hand-looms? We do not use them, but we keep them as precious relics. Our ancestors used them in founding the industry and in protecting the freedom of our country, and without them we should never have had our new, and as we are apt to fancy, perfect machines of manufacture and of defence. This is no doubt a sentimental argument, and one which to some appeals in vain. But there are arguments for the study of old, worn-out theories of a more practical and utilitarian kind. As in the most ancient literature and art there is something which speaks to the most modern mind, so in the oldest philosophical and scientific speculation we may find ideas not unfit for our present use. Many of these have of course been incorporated in later systems, but some have been neglected, and lie buried under the vast heap of forgotten things.

We may be sure of the mortality of all our theories, not only from what has happened in the past, but also from the fact that they are all partial. The broadest and widest chemical theory applies to chemistry, but it does not apply to other things. Yet we know with certainty, or rather we believe with firm faith, that all science is one, and that chemistry is a part of the one science of the universe. There is nothing that men of science are more fully convinced of than the real unity and harmony of nature. We cannot, therefore, expect to obtain a complete theory of anything until we obtain a complete theory of the whole. We advance step by step, from one theory to another, each more full and more general than its predecessor, but we are only a few steps on the infinite road towards the end, which we cannot expect, here at any rate, ever to reach. What is it we are looking for? We are looking for the one principle that underlies the whole of existence. I do not wish to digress into theology, but I think you will pardon me if if I say that we do know what explains the unity of nature, though we cannot by scientific methods hope to obtain a full knowledge: "Canst thou by searching find out God, canst thou find out the Almighty to perfection?" We travel along the road, though we cannot expect ever to reach the goal.

In considering the past, we shall look at two or three theories, and see how far they illustrate the outline I have given of the life of a theory. But first, I wish to take up a question which stretches from the very beginning of science down to the present time, and shows very curiously how we may sometimes come back to what look like the same ideas again from an entirely different point of view, and in an entirely different spirit. It is the question of the nature of matter, and how one kind of matter differs from another; what it is that makes wood, iron, glass, differ from one another. The old Greek philosophers had views upon this question. These views have a psychological interest, but have little connection with external nature. The learned Professor Kopp has shown that the reason why the Greeks made so little progress in the science of nature, in chemistry, physics, zoology and botany, lay in the habits of the people. It is impossible for you to make any progress in the science of nature without making yourself acquainted with the facts of nature; and these facts are to be obtained in the practice of the various arts. It is the blacksmith who learns something about the nature of iron, some of its physical and chemical properties. And so of the other arts. You may speculate as to what properties matter ought to have; your speculation will not affect the facts. These must be learned by the artisan, or in the artisan's way. The educated Greeks were not artisans. The vulgar work of making shoes, or clothes, of digging mines or building houses, all that was the occupation of the uneducated.

The educated wrote. The uneducated worked at various occupations and gathered up the rudiments of science—but not to be used, because they had not the education to use them. We have no writings of theirs. The people who could write occupied themselves with poetry, with philosophy, with politics, and with the fine arts. The vulgar parts of the fine arts were not, however, included, such as the grinding of colours and the mixing of them. Anything closely concerned with matter, even the making of bronze, was left to the slave. Therefore it was manifest from the habits of the Greeks that

it was impossible for the philosopher to have that practical acquaintance with the facts of nature which would enable him to reason with any amount of justness upon them. But of course they reasoned upon them whether they knew them or not, as you sometimes find people, who know very little about facts, state arguments in reference to them. The opinion which seemed to prevail was that matter was essentially one—that there was only one kind of matter, and that those differences which they roughly noticed were caused by certain implanted properties. So that you might take the redness out of one thing and put it into another. I can not now go through all the changes of view which took place from that time to the present, but we have had great varieties of opinion upon this matter. Coming down to the period of Boyle, he laid down the principle that you have no right to call a substance compound unless you decompose it, or form it out of its constituents—that that which has not been proved to be compound must be regarded as an element. And we now have a longer list of elements than I suppose anybody here can repeat. And many are more and more convinced, although it is not a matter on which there is any unanimity of opinion, that in some sense these elements really are elementary.

One of the most recent developments of theory is not unlikely to lead in a very surprising way to another form of the doctrine of matter. There is a theory which has scarcely yet got a name; we speak of it as the periodic law, or as the principle of Mendeléeff. I do not intend to enter here into any discussion as to the share various investigators have had in its origination; I speak of the theory itself. According to this principle, stating it very broadly—more broadly than we have as yet any right to state it—all the properties of an element, physical and chemical, can be deduced by calculation from its atomic weight; that given the atomic weight of an element you have all that you require to find out by calculation everything connected with it. If this were so, the whole of chemistry would be derivable by calculation from the atomic weights of the elements. This a very broad way of putting the theory, but it indicates the direction which it seems likely to take. We shall be obliged, of course, to examine it, and put it to the test. It may die of some disease of infancy or youth, or it may survive to old age. But there it is now. I may give you some illustrations of this theory without going into any details. It is not many years ago—no doubt many of you recollect the discovery—that M. Lecoq de Boisbaudran obtained from the zinc ore of the Pyrenees a new metal, to which he gave the name of gallium. This metal had been expected: theory led to the belief that there should be a metal with about the atomic weight which gallium actually has. From this atomic weight the properties of the expected metal had been calculated. Now the actual properties of gallium, some of them very remarkable properties, have been wonderfully closely anticipated by the calculations. Gallium has a low fusing point, it melts with the heat of the hand; it is, however, not sensibly volatile. These physical characters and many of the chemical characters of the compounds of gallium had been predicted before any one had seen the metal, or had the least idea where it was to be found. It is curious that another discovery of the same kind should follow at no long interval. About two years ago Professor Winkler, of Freiberg, discovered another new metal, to which he gave the name germanium. At first there was some doubt as to its atomic weight, but when larger quantities of the substance were obtained, this was determined with accuracy, and it was at once seen that germanium was a metal that had been expected, its general properties had been foreseen. Such examples of course add to the credit of the theory, but we are still a long way from anything like a proof that all the properties of an element are deducible from its atomic weight. Let us look, however, at what such a view would lead us to think as to nature of matter. Suppose that the difference between iron, copper, gold, silver, nitrogen, sulphur and so on, was merely that their atomic weights are different, all other differences being necessary consequences of this, what would that seem to involve? It would naturally lead us to the idea that after all the elements may be, if we may use the expression, made all of the same stuff: that the only difference between one element and another may be that the smallest particles of the one are of one size and the smaller particles of the other are of another size. We cannot suppose an atom of carbon reduced, say by filing it, to eleven-twelfths of its original mass and so turned into an atom of boron, but we may be led to imagine that, whatever the essential substance may be, it is the same in all elements. But such a view of the unity of matter would be altogether different from anything that could have been imagined by a Greek philosopher.

The view as to the constitution of matter which prevailed perhaps longer on the earth than any other, was that of Aristotle: because he ruled the schools of Europe during the whole of what are called the dark ages, and his philosophy was held to be as true as the theology of the Bible. Aristotle's view as to the nature of the elements has often been misunderstood. He had four elements; we all know them. Fire, air, earth and water. We must not suppose, as many of his later scholars did, that he held that these were real simple substances, and that by putting them together in various proportions you could make up all the different bodies which we find in nature. His elements were not elementary substances, they were elementary principles or properties. The idea was not that all things were made up of them, but that they were types of the different sorts of things. Later, this notion came to be mixed up with ideas derived from processes of analysis, and thus arose a confusion between elementary substances, in something like our meaning of the term, and elementary types in Aristotle's sense. Educated men learned something of practical work, artisans acquired some education, and so we have a considerable number of people in the middle ages who both thought and worked. They of course believed in Aristotle. They also had their own experience of the facts of nature, and they tried to work these four elements of Aristotle into the facts which they observed, and it was not a very easy thing to do. Varieties of opinion appeared from time to time. The common opinion of the alchymists was that there were three principles, salt, sulphur and mercury, of which everything was composed. These elements were not the ordinary bodies, salt, sulphur and mercury, but elements unknown by themselves, and perhaps only existing in compounds.

At the close of the mediæval period we come to what Kopp describes as the independent scientific chemistry of the time of Boyle. This developed a consistent theory, the first really consistent theory which we have in chemistry; this is the theory of phlogiston. It began with Becher, a German physician, and was greatly developed by Stahl, also a physician. They grouped together a great many chemical processes under the general head of combustion. Many of these processes had no great resemblance to the burning of charcoal, wood, or sulphur, but Becher and Stahl were quite right in their classification. All of these processes are now known to be, like ordinary burning, processes of oxidation. But as oxygen was then unknown they could not give the true explanation of their correct classification. They observed that the combustible lost something—it loses the capacity of being burned—and they represented this something as a material element, and gave it the name of "phlogiston." You must not suppose that these really great and most ingenious men were very blind because they missed the oxygen. Only consider

the difficulty of devising the apparatus necessary for studying the chemistry of gases; look at the arrangements we use for that purpose, and you will at once recognize, not only as a matter of fact but as a necessity, that it must have taken a long time and many workers to produce them. We wonder, not that Stahl missed oxygen, but that without the knowledge of it he succeeded in forming so complete a theory.

The doctrine of phlogiston was worked out by Stahl and his followers in a very complete manner; I may give an illustration. When lead is heated in the air it is converted into an earthy looking substance known to the old chemists and to us as litharge. We know that it is an oxide of lead; to Stahl it was lead which had lost its phlogiston. Now charcoal is an eminently combustible substance, it was therefore supposed to contain a great deal of phlogiston. If we heat a mixture of litharge and charcoal you all know what happens; the carbon takes the oxygen of the litharge, and metallic lead is left. See how this chemical change was explained on the phlogistic theory. The phlogiston of the charcoal was supposed to go to the litharge, and with it to make up metallic lead, which as we have seen was regarded as a compound of litharge and phlogiston. In the same way all processes of reduction were looked on as cases of transference of phlogiston from the reducing agent to the thing reduced. Gain of phlogiston is thus really loss of oxygen, and loss of phlogiston is gain of oxygen.

The theory served to bind the facts of science together, and of course in so far as it corresponded to a real relation of the facts, it enabled inquirers to make further progress and discover new facts.

What then brought this theory to an end? It was that which we might fancy should have prevented its formation. For many of the facts any one of which is really fatal to the theory were known before it was devised. These facts are that the combustible gains, instead of losing weight, when it is burned. The chemists of that time could not find this out in the case of ordinary combustibles, on account of their ignorance of the chemistry of gases, but they knew quite well that the litharge weighs more than the lead it was made from, and we are apt to wonder how they could think that it had lost something when they knew that it had gained weight. But the habit of looking at all phenomena from a quantitative point of view, universal with all true men of science now, is of comparatively recent growth, and it was only towards the end of the phlogistic period that the balance began to take its place as an instrument of chemical research.

One of the earliest chemical results of the introduction of the balance was the discovery, by Dr. Joseph Black, then a student of medicine in the University of Edinburgh, of the difference between the caustic and the mild alkalies. That there was a difference had been long known. It was also known that chalk, limestone or calcareous earth corresponded to the mild, and quicklime and slaked lime to the caustic alkalies. But it was not known what was the cause of the difference. The current opinion when Black began his work was that the limestone when burned took up a fiery something from the fire, and that this was transferred to the mild soda or potash in the process for making caustic soda or potash. You will at once see the analogy between this and the phlogistic theory of combustion. Here the removal of carbonic acid was represented as the addition of something, and this something was supposed to be transferred in the one direction, when, in reality, it was carbonic acid which was transferred in the opposite direction. Black investigated the matter in a truly scientific way, and found out what we now all know. It seems strange that he should not have gone on and applied the same method to the wider question. It was reserved for Lavoisier to do this. What influence Black's work may have had on the mind of Lavoisier we cannot tell; we know that the remarkable resemblance between the two cases is certainly much more distinct to us now, than it could have been to anyone then.

The new theory, which was to take the place of phlogiston, was of course ready to hand. It was only necessary to speak of adding and subtracting oxygen, instead of subtracting and adding phlogiston. I shall not follow further the story of chemical theory after the destruction of the phlogistic theory, but pass on to a much more recent example. This is what I shall call the theory of the "concatenation of atoms." I use this, a mere translation of the German "Atom-ver-kettung," because I do not know any English phrase which exactly expresses the idea. This is what is sometimes called "modern chemistry," not a very good name, for the meaning of it varies with the date. It is that way of regarding chemical compounds which is exhibited in "structural formulæ." I need not explain it to you, every modern chemical student understands its principle. But many of you do not remember its introduction. It had its origin in the types of Williamson and Gerhardt, in Frankland's discussion of the organometallic bodies discovered by him, and in Kolbe's theory of carbon acids, aldehydes, ketones and alcohols. But it is to Kekulé that we owe the full, clear, direct statement of the principle. I believe most chemists who are old enough to remember the publication of his first very short paper on the subject will agree with me in saying that it felt like a revelation. The thing was so obviously true, we had been groping about for it, Kekulé let in the light and then we all saw it. Since that memorable year, 1858, the theory has continuously advanced, growing in fulness and usefulness. To a mere branch of it, the theory of the aromatic compounds, we owe something like the half of the present organic chemistry. It has enabled chemists so to forecast their investigations that they can say, such and such a substance, with such and such properties certainly can be made, let us find the way to make it. And as time goes on, the way to these undiscovered substances becomes always easier and more certain. We see no sign of decay in this theory, we cannot foresee where it is to break down, or perhaps to give place to a successor which shall include what is of permanent value in it. But the science will not stand still. A new development is certain to come, and we must be prepared for it. What direction is the change likely to come from?

We need be in no doubt as to the direction from which the new development will come. Chemistry is a branch of the great science of dynamics. Some other branches of that science have been so far developed as to admit of strict mathematical treatment. Notwithstanding the marvellous advances made within our own memory, this is not yet possible in the case of chemistry; the extreme complexity of chemical phenomena has hitherto defied the mathematician. But here and there, in our own territory, we can see the beginnings of a change, and we must be ready for it. No modern chemist can any longer afford to be ignorant of general physics, and every chemist ought to have such a knowledge of mathematics as shall at least enable him to understand how physical questions can be treated mathematically.

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The Chairman moved a vote of thanks to Professor Crum Brown for his lecture. He said he did not think they could possibly have listened to a more instructive, and he might also say, a more entertaining address. It would be quite superfluous on his part to touch upon any of the points on which the Professor had so lucidly spoken. What the lecturer had laid down was that all their theories were temporary. If he (the Chairman) might be allowed to express an opinion, they were like the scaffolding of a building, which must be disused after the building was completed. He was extremely struck, among other things, by the concluding remarks of Professor Crum Brown when he referred to the side on which they must expect new theories in chemistry, that of dynamics. It struck him

as being an extremely true and fertile observation. He did not know whether he was correct in saying so, but he thought it very likely that one of the reasons why chemistry did not advance in the middle ages more rapidly was that Newton's theory of gravitation had not then been discovered. He thought it was extremely likely, if not certain, that what the Professor had hinted at would certainly come true—that the mathematical physicist would come forward with his calculations and theories as to the structure of matter ; and the chemist would have to look to his laurels to see that he was not anticipated. Therefore, he might again impress upon them that it was very desirable that they should add, as soon as possible, the knowledge of mathematics to their education. He was extremely glad, in view of his previous remarks, that that idea had fallen from the Professor, and there was no doubt that what he said emphasised his (the Chairman's) views very greatly indeed. If they were to continue the study and to appreciate the progress of science, it would become necessary that they should be able to understand the theories of scientific operations ; and he should hope that before long they would make some advance in that direction. He was sure that, meantime, they were most grateful to Professor Crum Brown for his address.

Mr. Daniel Frazer, Glasgow, seconded the motion, which was cordially adopted.

Professor Crum Brown briefly acknowledged the vote of thanks, and expressed his pleasure at having had an opportunity of addressing the Society.

Attention was then drawn to the following donations to the Museum :—

Antifebrin, antipyrin, betol, oxynaphthoic acid, saccharin, salol, African ginger (two specimens), bael fruit, balmony herb, *Croton Malambo* bark, Candeish opium, Carthagena ipecacuanha, Chilian aniseed, false buchu, false cubebs, false *Pareira brava*, false Zanzibar aloes, French liquorice, *Guizotia oleifera* seeds, gum resin of *Ferula alliacea*, Indian ipecacuanha root, lily of the valley flowers, Maltese aniseed, Maltese cummin, oil of *Pinus Pumilio*, Persian colocynth, Dalmatian *pyrethrum* flowers, slippery elm bark, *Quassia amara* wood, quassia turnings, *Huechys sanguinea*, Russian liquorice, section of Siam benzoin tree, sassafras bark, soapwort root (white), winter cherries.

From the Museum, Bloomsbury Square, London.

Herbarium specimens of British plants.

From Dr. Wm. Inglis Clark, Edinburgh.

On the motion of the Chairman a unanimous vote of thanks was awarded to Dr. Inglis Clark.

The meeting then closed.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The first meeting of this Association was held at the Blackfriars Hotel on Thursday evening, November 17, Mr. W. Elborne in the chair.

After the minutes of the previous meeting had been read and confirmed the introductory sessional address was delivered by the President, Mr. W. Elborne.

The Aspect of the Future Study of Botany and Vegetable Pharmacognosy.

BY W. ELBORNE, F.L.S.

Being the first meeting of the winter session it becomes my privilege as President to bid a hearty welcome in the name of the Association to the gentlemen present this evening, and to congratulate my fellow members on the progress the Society has made since the last opening meeting. According to precedent it also becomes my pleasing duty to deliver a short address on some subject connected with the object of our constitution, the promotion of the study of the various branches of knowledge allied to pharmacy. The theme I have selected for this evening's consideration is the aspect of the future study of botany and vegetable pharmacognosy, one suggested to me by a passage in the *Pharmaceutical Journal*, to the effect that twelve microscopes had been recommended to be purchased for the use of the students in the botany and materia medica classes at Bloomsbury Square.

You will, I trust, acquit me of undue pedantry by my, in the first instance, venturing to digress for a few moments from my original text to say a few words on study in general.

It has been well said that learning is not to be won by short cuts and royal roads, but by well ordered application and perseverance. The first necessity for a true student is, therefore, self-discipline, the power of framing our minds according to the dictates of our wills, and next, enthusiasm, without which nothing great or glorious has ever been performed. The object of the true student is not however to seek fame, but truth, which latter he must pursue by cultivated habits of accurate observation, patience and willingness to take pains, wherever it may lead him, and follow it, though it destroy many of his most cherished illusions ; such habits should of necessity be formed as early as possible in the student's career, for they constitute the basis of all education. The very title of student, more especially when applied to the class engaged in pursuits of original research, has ever served as a passport, and one common sympathetic bond of union among men of all nationalities, all working in most diverse manners at equally diverse problems, yet all aiming at one common end—a better understanding and knowledge of nature. And it will ever continue so. Hence it is that we are assembled here this evening, to give better opportunities for intercourse, to facilitate the interchange of ideas, and if possible, to improve our minds by the discussion of subjects tending to our personal welfare, and that of our calling. Such societies as these, since no two men attack a problem from exactly the same standpoint, have also the beneficial tendency, in some cases, of arriving at more accurate solutions of the problems brought forward, irrespective of the important function they offer of combined and representative action should occasion arise—in matters whether pharmaceutical or lay.

Before one can learn truly and properly the applications of a science, he must know the principles upon which those applications depend, and when the principles are mastered, the right understanding of the manifold operations of a subject including pharmacy, not only become evident, but, to thoughtful students, additional, improved, and sometimes original processes, and operations are discovered, and more often suggest themselves.

Consequently, the conditions of the sciences, the arts and industries of the world are ever changing, and wise men as a rule go with them, for it is impossible to stand still, we must either advance or retrograde. These remarks on study I will close in the words of a great philosopher :—"A man's nature runs either to herbs or weeds, therefore let him seasonably water the one, and destroy the other."

To return to the subject of herbs and weeds, the study of botany has of late years made enormous strides ; in fact, as studied in the laboratories of the present day it has little in common with the botany of the last generation. Thirty years ago botany, and also zoology, were not unjustly regarded as dry sciences ; they treated for the most part of the arts of preserving those mountains of carefully dried plants known as a herbarium, and of labelling shells, insects and animals. The botanist was an accumulator of a series of shelves of mummified plants, labelled with outlandish and savage names, the zoologist of a cabinet of shells and insects labelled in an equally barbarous fashion. It was the memorable task

of Huxley to show that in natural history there was a world of philosophy lying, like the figure in the block of marble, until someone could remove the rubbish which concealed it from the public gaze.

It was only when the 'Origin of Species' appeared that the world awoke to an appreciation of the mysteries they were for the first time admitted to. Nature it was shown was an orderly whole. The simplest fact was proved to possess a significance hitherto unsuspected, whilst on a thread of theory were strung the data which until then had lain huddled up, every year adding to the despair of those who were compelled to rummage for something they required. This will appear if we briefly sum up the history of the science.

Till the end of the fifteenth century the medicinal properties of plants were the only subject of interest even to those who attended to this branch of natural history. "Scire potestates herbarum" may stand as the motto of such botany as can be said to have existed in medieval or ancient times. Pliny, who devotes sixteen books to reproducing what was then known about plants, a miscellany of truth and error mixed up with absurd fables, tells us "that there are many more plants growing near hedges, public roads and in fields and ditches, but they have no names and are of no earthly use;" and yet this work acquired an almost unlimited authority as one of the standards of botanical knowledge in the middle ages (1530), as well as the work of his contemporary Dioscorides, in which latter six hundred plants are spoken of in such terms that modern botanists declare that he could not have for himself observed them.

The first attempts at scientific botany may be dated from the 'Historia Plantarum' of Otho Brunfels, of Mentz, published in 1530, in two folio volumes with wood cuts, but the plants are given without any arrangement; nevertheless, he deserves to be mentioned with honour as the first botanist who earnestly endeavoured to reform the science, and who published a work founded mainly on actual observation. In 1551 the work of Brunfels was succeeded by the 'Herbal' of Jerom Bock and by the work of Cæsalpinus of Arezzo, published at Florence in 1583. The above paved the way to what may be called the first great book on botany, the 'Rariorum Plantarum Historia' of Clusius, which infused into the subject the style of exactitude, precision, neatness, elegance and method.

The seventeenth century was also a time of great botanical activity; our own countrymen, Tradescant, Ray, and Morison, helped on the study of classification and nomenclature, while Leonard Pluknet, a London physician, made for that time a vast collection of eight thousand plants, now in the British Museum.

Modern botany may, however, be said to have begun with Tournefort, who has the merit of reforming and settling the genera, and as a testimony to the ability with which he effected it, it is noteworthy that the illustrious Linnæus adopted the greater part of the genera constructed by him. For his systematic knowledge of plants Linnæus was indeed indebted to the work of Tournefort, and subsequently, happening to meet with the small book of Vaillant on the structure of flowers, he saw at once many of the defects of the system he had hitherto adopted; and from the ingenious remarks of the latter writer, he conceived the idea of a system of botany founded on the stamens and pistils. The sole aim of the Linnæan artificial system was to help anyone to learn the name and history of an unknown plant in the most easy and certain manner, by first determining its class and order, and then making out its genus by comparing the parts of fructification with all the generic characters of that order, and finally its species, by examining all the specific definitions of the genus; the classes were divided into twenty-four in number (of Greek derivation), and their distinctions founded upon the number, insertion, or proportion of the stamens.

The final development of systematic botany is identified with the names of Jussieu and de Candolle, who applied the principles upon which Linnæus had arranged the species and genera to the formation of tribes, families, orders, and classes, until the whole vegetable kingdom was at last arranged on an all-embracing and strictly genealogical scheme. The natural method, as propounded by Jussieu, had in view, not the mere naming of plants, but the classifying them according to the resemblance that one tribe of plants bears to another. In order to do this it was necessary to discover the relative importance of the different organs; some were found to be so variable, even in the same species, that little dependence could be placed upon them; others, on the contrary, were more constant, and afforded better ground for classification. To illustrate this we have only to sow a quantity of seed of the same plant and watch it as it comes up. There will be scarcely two individuals among them that will exactly agree in the shape of the leaves and the height of the stem, thus plainly showing that characters derived from the stem and leaf are of the least importance and to be employed with caution. There will, however, be sufficient resemblance to convince anyone acquainted with plants that they all belong to the same species, but that is all. When we take several species and compare them together, we, in fact, find so great a variety in the stem and leaves that we look for characters elsewhere, and resort to the different parts of the flower; all genera, therefore, are founded on the consideration of the parts of the flower. An attentive examination of the various flowers of a genus will, however, prove that these also are, to a certain extent, variable, some species differing from others in the number or shape of the sepals or petals, or stamens or pistils. It is also noticeable that the sepals are less constant than the petals, and the petals than the stamens, which fact induced Linnæus to make the stamens and pistils, as being the most constant, the one basis of his system of classification. Now, as the outer portions were successively less constant than those which they enveloped, the natural system of classification goes a step further than the stamens and pistils, and penetrates to the seed. The external appearance of the seed is indeed subject to great diversity; but if the interior be examined, particularly the embryo, it becomes apparent that there are only two modifications, and on opening a great number of seeds, each of these modifications is found to be constant to a very extensive class of plants united together, whether by the structure of the fruit, the number of stamens, the parts of the flower, the anatomy of the stems or the leaves. Linnæus himself foresaw that these modifications of the embryo must form the groundwork of a natural system, and what he foresaw Jussieu demonstrated and brought into practice. These remarks, of course, only refer to plants in which a seed and embryo exist.

Since the time of Jussieu and de Candolle, the progress in systematic botany has been confined to the addition of new species, and to the elaboration of the details of classification, the number of species known to Linnæus being now multiplied tenfold.

Systematic botany is now reaching that condition that it is difficult to see how further progress of a serious kind is possible; the whole field is elaborately mapped out, and the only changes possible consist either in the shifting of some genus of anomalous affinities a few places up or down the line, or in the aggregation of species previously thought distinct, or segregation of one species into many by the elevation of what had been called varieties to the rank of species. This latter process is often carried to an excessive length, and its details are the subject of much dispute, since plants will not always grow exactly as they are described and figured, and the true moral to be drawn is that rigid immobility in the characters of natural species does not exist.

The study of botany however, in common with other

departments of biology, has, as previously stated, by this time left the classificatory stage far behind. Books on modern botany, such as Strasburger's* and Bower and Vines,† for example, presuppose but little knowledge of systematic botany, although such works are more profitably studied by those who are fairly familiar with main outlines of the latter. They deal with a different study altogether, and may be used by students who have never in their lives examined a growing plant, and who could not identify the easiest of the British *Papaveraceæ*. The minute structure of the plant in its various stages of growth, the processes, chemical, physical, and vital, which go on within it, and the homologies of its organs now constitute the subject of "practical botany;" the practice involved being that of the microscope and laboratory.

Students who desire to learn the outlines of classification and to be able to distinguish the plants they meet with in their walks will not find what they want in such volumes, but will have to work by other methods.

Lord Bacon, I think it is, that has somewhere said, and very pertinently, "some books are to be tasted, others to be swallowed, and some few to be chewed and digested;" among the latter, preeminently, students of pharmacy will still have occasion to chew Bentley with zeal, and swallow it as an article of pharmaceutical faith, to be digested and assimilated.

That the time, however, has arrived that such works as I have just mentioned on laboratory botany should be judiciously tasted and combined with the system laid down in such works as Bentley's‡ text-books, which hitherto have fulfilled all requirements, has frequently been expressed by all promoters of pharmaceutical education. Upon the practical knowledge of botany, a practical acquaintaince with the elementary structures of which plants are built up, more especially those of the dicotyledons, from which by far the largest proportion of vegetable drugs are drawn, the right knowledge of vegetable pharmacognosy in the detection and identification of substitutions and falsifications, very much depends. The danger, however, of introducing the laboratory method of studying botany to pharmaceutical students, whose time for study is, as well known, already very limited, and possibly already over-taxed, doubtlessly rests upon its being carried too far, to the curtailment of the existing methods, and possibly subjects of equal or greater importance. That a short laboratory course supplementary to the mode of teaching hitherto adopted is highly requisite, is no longer disputed, and in the immediate future a practical knowledge of cutting sections, the use of the microscope, and the recognition of the various vegetable cells, tissues, and their contents, will become an indispensable part and parcel of our botanical education.

Having acquired the proper manipulation of the microscope and of cutting and mounting specimens for temporary observation, the following may be taken as a partial outline of some of the principal botanical structures in the phanerogams to be studied by pharmacy students, either at home or in the botanical laboratory; a practical acquaintance with which, together with their characteristic reactions with chemical reagents is highly essential as an introduction to one of its most important applications, the study of practical vegetable pharmacog-no-y.

The cell.—The cell-wall, protoplasm, and nucleus, the cell-sap.

The cell-wall.—Suberous and lignified.

Protoplasm.—Primordial utricle, chlorophyll, aleuron grains, globoids, starch, starch cellulose, granulose.

The cell-sap.—Vacuoles, cystolithes, raphides.

The tissues.—Middle lamella, intercellular spaces.

Systems of tissues.—Parenchyma, prosenchyma.

A paper was then read entitled—

Practical Dispensing.

BY J. REDHEAD.

The first duty of a dispenser should be to read his prescription carefully through, from ℞ to initials at the bottom; and in so doing he should carefully note any errors which may have occurred in the writing; such as:—Symbol for ounce instead of drachm, omission of "liq." in front of morphine, hydrochlor., strychnia, etc., or of the word "dil." after acid hydrochlor., acid. nitric., etc. He ought then to carefully see that he understands the full rendering of the prescription in Latin; so as to be certain whether hyd. chlor. means chloral hydrate or calomel, and whether acid. hyd. dil. means acid. hydrocyan. dil. or acid. hydrochlor. dil. If acid hyd. dil. was prescribed in doses of from two to five minims in combination with sodii bicarb., bismuth, etc., no careful dispenser would use hydrochloric, whereas if in combination with drugs such as tinct. nucis vom., inf. calumbæ, etc., in doses of ten minims or upwards, he would not use hydrocyanic acid. His next duty should be to copy the prescription, and then to write the label or labels. I have two reasons for giving this advice, viz.:—In the first place, it gives his label time to become dry; thus the use of blotting paper (which should never be used where it can be avoided) is obviated. In the second place because when about to place his label on, it gives him an opportunity of comparing it with the prescription, to be quite certain he has made no mistake.

He should also notice the date of the prescription, because if a recent one, he has his guide in the B.P. of 1885, whereas if of a date previous to the publication of that manual, the 1867 preparations ought to be used where the 1885 B.P. has in any way altered them.

In proceeding to dispense his medicine, he should notice the ingredients carefully, so as to at once adopt the best method for turning out a presentable mixture, and in combining them so as not to interfere with their therapeutical effects.

He should be very careful lest by any means the wrong drug has got into his bottle. There are plenty which he would be able to distinguish and set right, from their appearance only; whilst, in others, such as between magnes. sulph. and zinc sulph., or liq. ammoniæ in the liq. ammon. fort. bottle, and so on, chemical tests would have to be used. This leads me to mention that the intention not to go in for the Major need not, nay, ought not, to be any hindrance to a man obtaining the necessary knowledge and skill for analysing his chemicals, etc., so as to be sure of their purity. It ought to be the duty of every chemist to test his chemicals before putting them into stock, and also those liable to deterioration, frequently, whilst in stock, so as to be sure of strength and purity, and not simply rely on the wholesale house, because it is himself, and not the wholesale dealer, who is liable under the Food and Drugs Act. Especially should he be careful about purity, etc., in his drugs intended for dispensing.

With regard to the actual method of dispensing, he should be very careful about his labels, to see that he is using the correct ingredients. Various methods have been recommended at various times to ensure accuracy. Poisons to be kept in special cupboards, or special bottles designed for them. Others recommended reaching down all the ingredients required for the prescription on the counter previous to commencing. For my own part, I have no great faith in any of these precautions; for instance, in the case of special cupboards, is it not possi-

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* 'Handbook of Practical Botany,' by E. Strasburger. Edited and translated from the German by Professor W. Hillhouse. Sonnenschein, 1887.

† 'A Course of Practical Instruction in Botany,' by F. O. Bower and S. H. Vines, with a preface by Thiselton Dyer. Part I. Macmillan, 1885.

‡ 'The Students' Guide to Structural, Morphological, and Physiological Botany.' Churchill, 1886. 'The Students' Guide to Systematic Botany.' Churchill, 1885.

ble for him to take out the wrong one? This applies also to special bottles. The reaching down of the bottles is, of itself, no safeguard, because, unless he replaces each bottle when used, what is to prevent him using it again, especially if he has been interrupted in his work. A better plan than that would be to reach down each bottle as it is required, and then leave it on the counter until he has finished, when he could again examine them, and compare them with the prescription to be sure of their correctness. But, to my mind, the only real safeguard is in the carefulness of the dispenser; he must notice his labels, then it matters not whether he has or has not special bottles, special cupboards, or special methods of reaching down or putting up.

I daresay most of us will remember the report some few weeks since of an inquest, in a case where a chemist dispensed a mixture for a lady. Being rather hurried (save the mark, a chemist never ought to be hurried, in the general acceptance of the term) he instructed his apprentice to reach down the bottles necessary, which he did, and the chemist proceeded to dispense. It transpired at the inquest, that he had reached down the bottle containing acid. hydrocyan. dil. instead of acid. hydrochlor. dil., with the result that the lady died. The chemist escaped with a censure; the apprentice also was censured, if anything, more than his master; but who was most to blame? The life of that lady was sacrificed because the dispenser failed in his most important duty of examining the label of each bottle before using the contents. In that fact lies the safeguard: carefully examine your labels. It matters not where your poisons are kept, nor in what kind of bottles they are stored, if you are not careful in that particular.

In asserting previously that a dispenser should never be hurried, I would add, neither should he be too slow. He should proceed in a methodical manner, and do his work with as much dispatch as possible. The overcautious man may make more blunders than the careless man.

There is another point in dispensing I ought not to omit; that is the question of weights. You all know that if a customer comes in for half an ounce, say, of epsom salts, you are bound to supply the same by avoirdupois weight; but if a prescription occurs with mag. sulph. ℥ss., it is a mistake to weigh that by the same weight. For instance, supposing the prescriber gives an 8 oz. mixture in ℥j. doses, and wishing to give ℥ss. doses of mag. sulph. he wrote ℥ss. Now it is clear that the troy or apothecaries' weight of 240 grs. is intended. If you weigh ½ an ounce by avoirdupois weight you are only giving 218·75 grains or 21¼ grs. less than is intended. In some things more important than mag. sulph. a difference of 2½ grs. per dose would be rather serious.

The use of the bottles containing the alkaloidal salts is also of great importance. In pouring from them, unless the neck is wiped each time, you will find an incrustation of the salt on it, left by the evaporation of the moisture. Now this has a bad habit of slipping off with the solution into your measure glass sometimes when you are pouring; consequently there is no knowing how much more than the correct quantity you are putting in your mixture. Moral: The neck of the bottle should be cleaned each time after using. For convenience of closer consideration from a practical point of view, which this paper is supposed to represent, I have divided the articles necessary to be compounded into several heads, viz., mixtures and emulsions, liniments, pills, ointments, suppositories and plasters, which I will now consider *seriatim*.

Mixtures.—In ordinary mixtures you must first notice what the ingredients are, whether they will undergo decomposition, and the order in which you ought to mix them. If you have potass. iod. and sp. æth. nit. in a mixture, and no alkali, you must first neutralize the sp. æth. nit. with pot. bicarb, otherwise iodine will be liberated from the pot. iod. If the mixture was clear you would notice something wrong, but if you had added inf. calumbæ, or any other coloured liquid, you would not notice it, and the mixture would go out in that condition.

It might previously or afterwards be prepared correctly, then probably one of the dispensers would have it returned as not being dispensed correctly, and each one would blame the other for the mistake. Again, a mixture contains tr. digital., tr. ferri perchlor., acid. phos. dil., etc. If this be prepared by adding acid. phos. dil. last a brownish-black mixture will result from the contact of tr. dig. and tr. ferri; but if the tr. ferri is added to the acid phos. dil. phosphate of iron is produced, and the mixture is clear. That is the intention of the prescriber, and if the mixture is not so dispensed a mistake is made, and if the patient has had it dispensed elsewhere before it will in all probability be returned.

Another point to remember is that we should try to win the confidence of both medical men and public, consequently we ought to know the proper methods to adopt so as to obviate any returning of mixtures. In noticing excessive doses we want to be sure we are on the right side, so as not to unnecessarily trouble the prescriber; it will give him a better idea of our abilities. For instance, the following was presented to me a few days ago:— ℞ Tr. hamam., ℥iv.; liq. ferri dialy., ℥iv.; liq. strych., ℥ss.; aq. m. pip. ad ℥xii.; sig., ℥ss., 4 in die. If dispensed as written you would be giving ℥iss. doses of liq. ferri dialy., which is evidently not the prescriber's intention, and he should be consulted. In my case the prescriber had left, when I got it in, so I used ℥iv., and mentioned it to him the next time I saw him, when he told me I was right, and that he thought he had written ℥iv. In the case of mixtures containing insoluble powders, and no medium for suspension is ordered, mucilage must be used. Acacia mucilage may be used, but if much tincture or spirits are ordered you will find it better to use tragacanth mucilage. In fact, it will be found better than acacia in any case, as it is a better suspender. Do not use mucilage unnecessarily. A mixture containing mag. carb. would not need mucilage, as it will be distributed by shaking. Of course in both cases a "shake of the bottle" label should be affixed. When tinct. canabis indica is ordered in a mixture it should be triturated with mucilage of tragacanth before adding the other ingredients, otherwise the resin will be deposited on the addition of water.

Emulsions.—If pulv. acacia is ordered as the emulsifier for such drugs as copaiba, ol. ricini, ol. morrhuæ, etc., it is recommended generally to place the powder in a mortar, then the copaiba oil, or whatever it may be, and incorporate it with the powder, adding the water gradually. A better plan is to place the powder in a mortar, add sufficient water to form a paste, then incorporate your oil, or whatever it may be, by adding gradually with trituration; then adding the water in the same manner, an inseparable emulsion will be the result. That is my *modus operandi* in such cases, and I never failed to get an emulsion. If mucilage of acacia is ordered, proceed by putting the mucilage in the mortar and triturate in the same manner. Do not use a mortar to any mixture or emulsion when it can be avoided. In some instances an emulsion may be made without the use of a mortar, for instance, copaiba, prescribed with liq. potassæ, may be emulsified by simply shaking together in a bottle. Where the liq. potassæ is ordered in *quantum suffic.* use half quantity of it as of copaiba.

Liniments.—There is very little for me to say with regard to these medicaments, ordinary liniments being simple enough to compound; but there are two of the B.P. liniments which will bear a little examination, namely, linimentum hydrargyri and linimentum terebinthinæ.

With respect to the linimentum hydrargyri the directions of the B.P. are sufficient to make a good preparation, but what I want specially to mention with regard to it is the solution of ammonia, and this remark holds good in all

other cases where it is ordered to be used. It is ordered to be made by diluting one part of strong solution with two of water. Now the strong ammonia of commerce is of a specific gravity ·880, and the mistake is generally made of using that when strong ammonia is ordered in the B.P. Now as the B.P. strong ammonia is of a specific gravity ·891, it follows that the ·880 should not be used as B.P., but it ought to be reduced to B.P. strength by diluting with water. I wonder how many chemists do that, or even how many know how much to add. Some little time ago a letter appeared in the *Chemist and Druggist* saying that the writer was a candidate for the Minor, and the examiner asked the question, "How much water would you add to commercial liq. ammoniæ ·880 to reduce it to the B.P. strength?" He said, 10 per cent. (evidently a guess), and wished to know if he was correct, and by what means he should calculate. The editor kindly gave him all he asked for. The same remark applies to rect. spirit and glycerine, both of which are commercially above British Pharmacopœia strength.

With regard to linimentum terebinthinæ, no doubt most of you are aware what a quantity of ink has been wasted over the question as to what the preparation should be. Some got a separable liquid, others an inseparable but unsightly one, whilst others get a jelly, and invariably not twice alike. Personally, I never had any difficulty with it, but I soon found that the product depended entirely on the manipulation. When I said I never had any difficulty with it, I was hardly correct. The first batch I made was of a creamy consistence, but the second was a thick jelly, which I had to throw away. Remembering that I had slightly varied the mode of preparation, I prepared a fresh lot in the same manner as at first, with the same result. My experience with it is the same as Professor Redwood, viz., it all depends on manipulation. The following is the method to adopt:—First, place the soap in the mortar and triturate with the water; care must be taken that all lumps are broken; this will require some time to triturate. Then, just liquefy gently with your turpentine and camphor, so as to get it just into a fluid condition; next add the turpentine in tolerable large quantities at a time, so that you get it all in at about four or five times; then you will get a white creamy liniment. If you add the turpentine gradually all the time you will get a jelly, and if you do not just liquefy with a small quantity first you may get a fluid.

If you get prescriptions from anyone who has been at the Royal Infirmary the probability is you may have ℞ ext. bellad., ℥ss; glycerine, ℥ss.: ft. lin. The plan I adopt with this is to heat the ext. with a small quantity of water, so as to thoroughly soften it, evaporating off the water and add the glycerine, when it will thoroughly amalgamate.

Pills.—When no excipient is prescribed you must use the most suitable one for your ingredients, one that will be sufficiently plastic and at the same time give a firm mass, and one that will not cause any decomposition of the ingredients. As a general rule, glycerine of tragacanth will be found a convenient excipient to use, except essential or other oils are ordered, when it will cause the oil to exude. Soap should not be used as an excipient when iron is an ingredient. Glycerine should be used very sparingly as being hygroscopic; it keeps the pills too moist. For aloes a good excipient is dec. aloes co.

Pills require great care in manipulation, and anyone on the wrong side of the Minor should cultivate neatness and carefulness in pill making. The mortar should be scraped out thoroughly and care should be taken in rolling so as to get it evenly divided. It is very unpleasant for a Minor candidate, when the examiner proceeds to weigh a few of them and finds a difference in the weight of them; it is also an important matter when your pills contain such drugs as acid. arsenios., strychnine, etc.

Care must be taken in weighing out each ingredient. I remember a candidate making some pills, and when finished, the examiner weighed the whole of them and found they were not as heavy as the weights of the ingredients. In massing they should be thoroughly amalgamated. Too much haste must not be made. Give the mass time to amalgamate.

If you have strychnine, or any other poisonous alkaloid, it is best to triturate it with a little sugar of milk previous to adding the other ingredients.

Plasters I have very little to say about. The only point is to select a smooth leather, and mind not to make your iron too hot. I heard of a candidate some time ago who had a belladonna plaster to make: he brought his iron red hot, and not only made a delightful perfume but burnt a hole through his leather.

Suppositories.—Sometimes a great nuisance and a great trouble to candidates. A plan which I have worked out and found to answer admirably is the following:—I place the medicament on a slab, then, having melted the ol. theobrom., pour a small quantity on it and rub up, then put it into the dish with the remainder of the oil, stirring until cool enough to pour off. By so doing it is thoroughly amalgamated. With ext. belladonna first soften with a few drops of hot water. I always moisten the mould with glycerine, there is then no fear of them sticking, they will come out beautifully. If you have tannic acid in suppositories you must allow a little more ol. theobrom.

Ointments. There is nothing very difficult with ordinary ointments. There is one point to be remembered, that is, if you have an ointment with a small quantity of an active ingredient, the proper mode is to dissolve it with a suitable solvent first, so as to render it thoroughly miscible; for instance, hyd. perchlor. a little spirit, pot. iod. a little water, and so on.

Powders.—With these it is necessary to be very careful to get the ingredients thoroughly mixed previous to dividing. With such ingredients as hyd. c. creta and sodii bicarb., you will have no difficulty in ascertaining when thoroughly mixed, owing to the colour. But with such things as hyd. subchlor. and pulv. tragac. co., or other ingredients of the same colour, there is a greater difficulty. The mode to adopt is first to triturate with a small quantity and then add the bulk.

In dividing the powders "rule of thumb" should never be adopted. Each powder ought to be weighed out carefully, or if you have, say four, to make, you may balance the bulk by means of the scales into two parts, then again each part into two, but the easier way is to weigh each powder separately. If your bulk will not weigh out equally in grains, add a sufficient quantity of sacchar. alb. or sacchar. lactis in preference. If you have an ingredient in fractions of a grain, and the number of powders will not amount to equal grains, you must make sufficient to bring it equal, and keep back the surplus powders. For instance, you have res. podoph., gr. $\frac{1}{3}$: ft. pulv. mitte vj.; you must make eight and keep back two, and so on.

In conclusion, I wish to emphasize the point with which I commenced, viz., use carefulness and dispatch. See that all your articles required for use are thoroughly clean; your counter, mortars, glasses, bottles, etc. Be careful to get all your drugs out of the measures and mortars into the bottles, and with pills, to scrape out all the mass and get it into your pills.

More men fail in dispensing than in any other subject, and very often they are at a loss to account for their failure. They must remember that the examiners are not blind, and that they are on the watch constantly, so that, although the candidates may turn out presentable products, perhaps the examiner may have noticed some carelessness on their part, denoting that if careless there, where so much depends upon them, they would be equally or more so elsewhere.

A vote of thanks was given to the author.

Proceedings of Societies in London.

SOCIETY OF ARTS.

The Development of the Mercurial Air Pump.

The history of the mercurial air-pump has been the subject of an exhaustive inquiry recently undertaken by Professor S. P. Thompson, who embodied the results of his search in a lengthy paper on "The Development of the Mercurial Air-Pump," read before the Society of Arts on Wednesday, the 23rd inst., of which the following is an abstract :—

All true mercurial air-pumps are, of course, based upon the principle of the barometer; that is to say, the vacuum is constituted in the manner invented by Toricelli, namely, in an enclosed space above a barometric column. In all of them the object is to render the Toricellian vacuum as perfect as possible.

This discovery of Toricelli in 1643 furnished the Florentine Academicians with the only known means of producing a vacuum until the invention of the mechanical air-pump by Von Guericke in 1650. Since that time the fundamental observation made by Toricelli has been enlarged upon in so many ways, and its application so extended, that Professor Thompson has found it desirable to classify mercurial air pumps under six heads :— (I.) Those which drive the air up a barometric tube ; (II.) Those which drive the air down a barometric tube ; (III.) Those which drive the air up one barometric tube and down another ; (IV.) Combination pumps; (V.) Injection pumps, dependent in their action upon the velocity of efflux of a stream of mercury ; (VI.) Mechanical mercurial pumps.

The oldest of all mercurial pumps belongs to the first class, in which the air is forced upwards above the top of a barometric column. It was invented by Emanuel Swendenborg in 1722, and described by him in his 'Miscellanea.' The apparatus consisted of a receiver, standing, as in the ordinary air pump, upon a plate, and beneath it a hollow conical iron vessel connected with the receiver by means of a valve opening downwards. The lower end of the iron vessel ended in a flexible leather tube, the free end of which was bent upwards and adapted to an iron tube with an open mouthpiece, mercury being introduced into the bend of the tube. By alternately raising and lowering the flexible tube, and consequently the level of the mercury, air could be drawn from the receiver into the conical iron vessel by means of the valve connecting them, and then expelled from the latter through another valve opening outwards. Sixty years later a second form of the same class was devised by Dr. J. Baader, the improvement consisting in the bent tube being rigid, with a tap at the bottom to draw off the mercury contained in the two arms, whilst the air thus drawn into the one arm from the receiver was expelled into the atmosphere by the arms being refilled with mercury poured in at the top of the other. A very finely-constructed glass pump on this principle exists in the collection of apparatus in the physical laboratory of University College, London, the pump head being a substantial glass vessel capable of containing about 400 lbs. of mercury. In 1787 C. F. Hindenburg introduced a piston and cylinder to drive the mercury up and down in the barometric tube. After the introduction of several other forms, K. T. Kemp, of Edinburgh, in 1830 designed a double-acting pump, in which a winch, manipulated like that of the ordinary mechanical air pump, moved two pistons up and down in two cylinders full of mercury and provided with valves. In the year 1855 Dr. H. Geissler, of Bonn, introduced his famous pump, which did such excellent work in exhausting the Geissler vacuum tubes. The first form of his apparatus consisted of a vessel containing the supply of mercury connected to the lower end of the barometer column by an india-rubber tube, the pump head at the top of the column being provided with a three-way tap. On raising the supply vessel, whilst the tap was so turned as to allow of communication with the outer air, the air in the pump head was repelled ; on shutting off this communication, establishing communication with the vessel to be exhausted, and lowering the reservoir, the mercury in the pump head sunk and drew in air through the exhaust tube. Inherent imperfections of the three-way tap, and the liability of fracture when the supply vessel was suddenly raised had to be overcome, and at a later period it was found an improvement to have above the three-way tap one or more stoppered chambers, as the vacuum produced in these chambers by their being closed as the column of mercury fell materially assisted in the exhaustion when opened as the mercury rose. Various improvements as to the materials for construction of this pump were afterwards made, and in 1866 G. Jolley provided it with a mechanical device of a winch and pulley to raise and lower the supply vessel. In 1873, Mitscherlich introduced a valve made of a glass rod, but a more ingenious valve was invented by Schüller in 1881, being dependent upon the fact that the mercury, by virtue of its great surface tension, forms a cap over an orifice, three millimetres in diameter interposed in the tube.

Class II.—Downward-driving Pumps.—The idea of expelling the residual air down a barometric column originated with Dr. Hermann Sprengel, who in 1865 brought out the pump which is associated with his name. He had been studying the uses in the laboratory of the water-trombe or aspirator, an instrument used for some hundreds of years for delivering air under pressure, but he appears to have originated the idea of substituting falling mercury in the place of falling water, in order to extract gases by means of the vacuum produced above the column. In the original Sprengel pump the supply-vessel was a funnel fixed at the top, from which the mercury was delivered at a steady rate through a narrow india-rubber tube, nipped by an adjustable pinch-cock. After passing this point it fell in drops down a glass tube of narrow bore but having strong external walls more than 30 inches in length, and known as the fall-tube. As it fell it swept out the air of the tube and the air which entered from the side, each drop acting as a piston to propel the air below it. To secure this action, it was essential that the fall-tube should not be too wide. For rapid, partial exhaustions, an internal bore of 2 to 3 millimetres appears to be about the best size ; for slower exhaustions, carried to the highest degree of rarefaction, a bore of 1·4 to 1·8 millimetres is preferable. During the first stages of the process of exhaustion, whilst yet there is a considerable amount of air in the fall-tube, the successive drops of mercury move separately down the tube, almost silently, being separated from one another by the intervening cushions of air, which as they descend the tube become more and more compressed. As a higher degree of rarefaction is attained there is no longer a sufficient cushion of air ; the drops fall smartly through the vacuous space with a loud metallic clinking sound as they strike upon the top of the barometric column, which occupies the lower 30 inches or so of the fall-tube. At the bottom of the fall-tube the air and mercury enter a suitable vessel, from which the mercury is periodically poured again into the supply funnel at the top. In Sprengel's second form, a downward bend is inserted between the supply-funnel and the point where the mercury begins to break away into drops. This bend leads to a small chamber, virtually the pump-head, from the end of which the mercury falls in drops. The introduction of the Sprengel form of pump at once revived attention to the advantages of mercurial pumps for exhausting. Graham applied it to extract minute quantities of gases in his researches on gaseous diffusion ; Bunsen adapted it for the purpose of hastening filtration, employing a form somewhat modified to admit of the use of drops of water instead of drops of mercury. Improvements began to be introduced into the details of construc-

tion, as experience revealed the imperfections. It was found that air was liable to be carried down into the pump through the supply-vessel at such times as more mercury was poured in above, and it became necessary to trap off such air bubbles to prevent them from vitiating the vacuum already attained. It was also found necessary to introduce vessels containing drying materials, such as concentrated sulphuric acid, or glacial phosphoric acid. The fall-tubes were found to crack and break off just at a point thirty inches above the lower end, in consequence of the hammering action of the falling drops during the later stages of exhaustion. Better and more reliable gauges were required to verify the degree of rarefaction. Lastly, some remedy was wanted for the difficulty experienced in forcing down through the thirty inches of barometric column the last small traces of residual air in the fall-tube. The falling drops hammered these residual bubbles into the mercurial column below them ; the air bubbles, on their part, always tended to rise again into the upper part of the tube ; often they would stick to the wall of the glass tube, refusing to move, though the mercury continued to flow past them. The remedy of turning on a more sudden flow of mercury to sweep them out was not always successful. Indeed, when it is remembered that these last residua must be re-compressed to atmospheric pressure, in order to expel them at the bottom of the tube, it would seem strange if such a method of expelling the residual air should prove effectual. By the year 1874 two modifications had come into extensive use ; the mercury, instead of running direct into the pump from the supply-vessel, was carried down a vertical tube, surrounded by a wider external one, so that any air bubbles accidentally carried down escaped up the wider tube instead of entering the pump ; also after passing this trap, the mercury was forced up again in a moderately wide tube, ascending to a slightly lower level than the supply-vessel, and again descending. The upper bend of this tube communicated at its highest point with a small stoppered chamber, partially exhausted of air by filling it with mercury, which was then allowed to run out. As the mercury passed over this bend, it consequently fell through a partially exhausted space, and was still more thoroughly freed from air before ascending to the head of the actual pump. A very important addition was the improved gauge introduced by McLeod, in which was applied the principle of compressing a known volume of the rarefied air or gas into a smaller known volume (the ratio of the two volumes being accurately known) and then measuring its pressure, and so calculating backwards. It may be regarded as a refinement upon the method of the "pear gauge" invented by Smeaton. About the same time, Crookes introduced several improvements, and it was with this improved pattern of Sprengel that Crookes was able to carry out his researches upon the repulsion accompanying radiation, which culminated, in 1875, in the invention of the radiometer, and later led to the discovery of the phenomena of "radiant matter." From 1875 to 1884 a series of modifications were introduced by Gimingham. Firstly, the process of exhaustion was accelerated by the employment of multiple fall-tubes, receiving their streams from a distributing jet within the pump-head. Three fall-tubes were employed, then five, later seven ; but five appears to be a preferable number. The conclusion derived from comparison of results of experiments made with varying bores to determine the best size of bore for the fall tube is that at high degrees of exhaustion the last portions of air or gas are carried out by entanglement with the mercury, and not by the mercury acting in definite "pistons" to sweep out the gas. With respect to the length of the fall-tubes, it was found that those 39 inches (1 metre) long, giving a fall of 9 inches (or 22·5 centimetres), exhausted more rapidly than tubes only 33 inches (85 centimetres) long. Tubes longer than 39 inches were found liable to fracture, in consequence of the severe concussions of the mercury as it fell upon the top of the barometric column. Von Babo made the Sprengel pump supply itself with mercury, by the device of connecting it to a water-aspirator, worked by a constant stream of water. This aspirator draws in air and mercury at the lower part of the pump, and lifts it up through a narrow tube to a height above the level of the mercury in the supply-vessel.

Rood's pump is so mounted that all parts of it can be heated by means of a Bunsen's burner. Great importance is attached to this point, as much higher exhaustion is thereby attained. The Sprengel pump employed by the Edison Company in the manufacture of glow-lamps, has a simple fall-tube cemented at its lower end into an iron tube, which carries away the ejected air and mercury from a series of such pumps. An iron supply-pipe overhead feeds the pumps.

Shortened Pumps.—The length of the pump-shaft in the preceeding classes being necessarily equal to that of the barometric column, all these forms of apparatus are more or less unwieldy. Although a column of mercury 76 centimetres high is a necessity for working between vacuum within and atmospheric pressure without, no such length is required when working between vacuum and a reduced pressure. In fact, the length of the pump may be shortened by reducing the pressure of the air above the surface of the mercury in the supply vessel, in all pumps of class I. and class II. The first suggestion for shortening the pump came from Robinson in 1864, and was almost immediately followed by one from Poggendorff. In these apparatus a common air-pump worked by hand was used to produce a partial vacuum. The pump-shaft was quite short, and ended in an auxiliary chamber, closed at the top, but having a tap communicating either with the auxiliary pump or with the outer air. The three-way tap above the pump-head also opened into a tube which could be made to communicate either with the auxiliary pump or with the outer air. Many other modifications in this variety of pump have been suggested. The most recent shortened Sprengel pump is that of Dr. W. W. J. Nicol, described before the British Association at Manchester, the automatic action of which is identical with that of von Babo. It requires only about 300 c.c. of mercury.

Class III.—Upward and Downward Driving Pumps.—The earliest example of a pump which drives the air up one barometric column and down another, was devised by Mile, of Warsaw, in 1828. This pump is a hydrostatic air-pump without cylinders, taps, lids or stoppers. The mercury is raised in the barometric tube and pump-head by lifting an external cistern of mercury, which first cuts off communication with the vessel to be exhausted by entering the mouth of the exhaust-tube, which is sealed in through the pump-head: and on further rising it expels the enclosed air through a narrow tube sealed in at the top, which bends over to the right and terminates below in a cup of mercury into which its open end dips. The exit-tube and cup constitute a barometric trap, for when the supply cistern is lowered the air cannot return, the mercury rising in the tube to a height depending upon the degree of internal rarefaction. To prevent the mercury from being forced into the vessel that is to be exhausted, the exhaust-tube is prolonged overhead to a height exceeding that of a barometric column. The total height of this pump is, therefore, necessarily, about 9 feet. It may be looked upon as a sort of Swedenborg pump. The two valves that open inwardly and outwardly into the pump-head are replaced by barometric air-traps. With such a pump, properly used, a fairly high degree of exhaustion ought to be possible, but it appears to have fallen into utter oblivion, and its useful principle has been several times re-invented. The use of a second barometric column, down which the air is expelled from the pump-head, is generally attributed to Toepler, of Dresden, whose form

of pump, if it were not that it antedates Sprengel's' might be regarded as a combination of the Geissler and Sprengel pumps. Several modifications of Toepler's pump have been introduced, the most prominent being a recent construction by Siemens. A peculiar form of this class of pump was invented by Le Clere, and consists of a circular glass tube connected at different points with the vessel to be exhausted and a bulb partially exhausted by means of a mechanical air pump. By means of the mercury being made to rotate round the circle in one direction, air is abstracted from the one vessel and delivered into the partially exhausted bulb.

In the fourth class, consisting of combinations of the foregoing classes, Edison has introduced an instrument, but it does not appear to have any advantage over either the Sprengel or Geissler pump. Concerning a more recent introduction by Bottomley no data are at present available.

In the fifth class there are only four inventions, none of which are of any importance, but that of Romilly is noticeable for depending for its *modus operandi* upon centrifugal force.

Of the sixth class only one representative is at present known, and that has been recently introduced by Winshurst, and consists of a chain of steel buckets, which, made to pass up one tube, are inverted on reaching the top, and then pass down full of gas through the mercury in the other tube.

As regards the results obtainable by different forms of pumps, it might be mentioned that in 1874 Crookes obtained a partial vacuum which he estimated as only containing one-seventeenth of a millionth of an atmosphere, whilst Gimingham gives as an easily obtained average result one-ninth of a millionth of an atmosphere, and in Helmholtz's laboratory with twenty-five "strokes" of the new Geissler pump a vacuum of one-eleventh of a millionth of an atmosphere was obtained. In conclusion Professor Thompson said that he did not think sufficient notice had been taken of the advantage of crooks in the fall tube, as shown in Mee's pump, and he considered that if this principle were combined with the shortened form still higher vacua would be obtained.

In the discussion the Chairman, Mr. W. Crookes, mentioned that he had obtained a vacuum equal to one-hundredth of a millionth of an atmosphere, which he compared to a space of one-tenth of an inch at the top of a barometric tube two hundred miles in height, and even then this vacuum would, according to hypothesis, contain ten million million molecules. Mr. J. Swinburne said that he had always found the long form of pump preferable to the shortened, and expressed a doubt as to whether such high vacua could be accurately measured, owing to the tension of the mercury vapour, although in answer both the lecturer and Chairman stated that precautions had been taken to counteract this. According to the general opinion of the speakers much higher vacua can be obtained with the Geissler pump than with a Sprengel pump under the same conditions. Mr. Crookes mentioned that if gallium could be obtained in sufficient quantity it would be a a perfect metal for producing vacuum, as it is liquid at 86° F., gives off no vapour, and does not oxidize.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, November 17. Mr. William Crookes, F.R.S., President, in the chair, when the following papers were read :—

Zinc-copper and Tin-copper Alloys. By A. P. Laurie.—The author finds that if the zinc plate of a Daniell cell be replaced by a compound plate formed by joining copper and zinc, the cell has the same electromotive force as one in which zinc alone is used ; this is true even though the zinc surface be only one-thousandth part of the copper surface. If the zinc plate be replaced by copper-zinc alloys, no deflection of the electrometer is observed as long as the alloy contains less than 67 per cent. of zinc ; at this point, however, a big deflection, practically equivalent to that given by zinc, is suddenly obtained. This result, in the author's opinion, may be taken as evidence of the existence of a compound of the two metals $CuZn_2$. Alloys containing a greater proportion of zinc behave like zinc alone. Similarly in the case of tin-copper alloys, a sudden rise of electromotive force is observed when the proportion of tin in the alloy exceeds that which would be contained in a compound of the formula Cu_3Sn. This result is in harmony with the evidence already obtained by observations of the density and thermal and electrical conductivity of the copper-tin alloys. If an alloy containing a larger percentage of tin than Cu_3Sn, in a state of fine division, be placed in a copper cup and used in place of the zinc in a cuprous chloride cell, the excess of tin is gradually eaten out, leaving approximately the alloy Cu_3Sn ; this alloy undergoes no change if the circuit be kept closed.

Dr. Wright, after asking whether the author has made any experiments with ternary alloys, referred to observations which he had had occasion to make on lead-zinc-tin alloys. It is well known that lead and zinc will not permanently mix, but that on cooling the lead separates with a little zinc and the zinc with a little lead : he had found that tin behaved itself indifferently to the two metals, dividing itself between them ; but the zinc appeared to be able to take up more lead, and the lead more zinc, in presence of the tin.

Mr. Ball said that under Professor Robert Austen's direction he had made experiments on the effect of melting lead—a metal which does not alloy with copper—with copper-tin alloys ; it was found, however, that the lead had no influence, the copper-tin alloy separating out unmixed.

The Halogen Substituted Derivatives of Benzalmalonic Acid. By C. M. Stuart, M.A.

Note on a Modification of Traube's Capillarimeter. By H. S. Elworthy.—The author describes a modification of Traube's instrument for determining fusel oil in spirit by measuring the capillary depression, the essential feature being that the tube is fixed at an angle approaching the horizontal instead of vertical. In Traube's instrument a pure 20 per cent. (by volume) spirit is said to rise 50 mm. ; but in the author's modification the rise is 173 mm., and 1 per cent. of fusel oil produces a depression of 25 mm. instead of only 7 mm.

The Formation of Hyponitrites : a Reply. By Edward Divers, M.D., F.R.S.

Reply to the Foregoing Note. By W. R. Dunstan.

Review.

The Principles of Pharmacognosy. (Flückiger and Tschirch). Translated by F. B. Power, Ph.D. Wisconsin.

This work, originally published by Professor Flückiger in 1873, has been greatly revised and extended, and a new second part written by Dr. Tschirch has been incorporated with it. It professes to give a complete account of the principles on which the study of pharmacognosy should be based, and opens with a discussion of the true mission of the subject. The author holds that the primary object of modern pharmacognosy, properly so-called, is to scrutinize all the evidence offered by botany, zoology and pharmacy, regarding medicinal agents, to arrange this material in scientific form, and by an appropriate and comprehensive representation to subject it to a closer examination. At the same time he is careful to exclude from his consideration the medicinal action of these different substances, so distinguishing between pharmacognosy and therapeutics.

Passing somewhat rapidly over many collateral points, including geographical distribution of medicinal plants, modes and localities of cultivation, methods of collection and preparation of the substances they yield, the author goes at considerable length into the details of the history of our knowledge of medicinal substances. This to many readers will be the most interesting part of the book, the subject being treated with considerable care, the chief authorities on the different sections being quoted and a comprehensive statement of the work of different nations and of different individuals being put forward. In dealing with different aids to the study of the subject valuable information is given as to the several collections of drugs and plants which are available in different countries to the medical student, and a fair account of the most important literature of the subject is appended.

The latter part of the book deals more particularly with the vegetable substances used in pharmacy, and professes to give the results of all the recent work in botany, bearing upon their morphology and anatomy. There is here a good deal of valuable information, but the worth of it varies. From a botanical point of view exception may be taken to many of the statements made. The definition of secondary roots given on page 57 might be improved. The author draws no distinction between *secondary* roots and *adventitious* roots, his definition clearly including both. The statement on page 61 that on cylindrical stems the leaves are arranged in spirals is too absolute. Perhaps the part most to be objected to is the author's conception of the formation of bark. He says, page 233, "The name is used to designate the entire collections of cells located outside of the cambium." As he refers in several places to De Bary's 'Comparative Anatomy of the Phanerogams and Ferns,' which is now the standard text-book upon vegetable anatomy, this statement is somewhat astonishing. The limits of the bark do not at all necessarily coincide with the position of the cambium ring, being dependent altogether upon the formation of layers of cork, which, arising successively in deeper layers of the cortex, cut off successively deeper zones of tissue. These zones of tissue thus separated from the inner part of the stem constitute the bark and, as may be expected from this mode of origin, different specimens of bark differ from each other as to the amounts and situation of the different tissues found in them. (Compare De Bary, Eng. ed., p. 555, *et seq.*)

The author draws a totally unnecessary distinction between bark and what he terms *bork*, which is only a particular case of the formation of bark.

The work on the morphology of the flower is more trustworthy, and the modifications of the inflorescence and of the fruit are clearly stated and well illustrated.

The concluding chapter on micro-chemical reagents is likely to be very useful to the student. It is necessarily not at all complete, but it gives information of value on the more commonly occurring points that the worker in histology has to deal with. In some respects it savours rather of the *theoretical* than the *practical* histologist, the method given of mounting objects in Canada balsam being impracticable, and the recommendation of black asphalte varnish to cement the cover class being likely to lead to much vexation on the part of the operator.

BOOKS RECEIVED.

Repetitorium der Chemie. Mit besonderer Berücksichtigung der für die Medizin wichtigen Verbindungen. By Dr. Carl Arnold. Hamburg and Leipzig: L. Voss. 1887. From the Publisher.

Die Hauptthatsachen der Chemie. By Erich Arnold. Hamburg and Leipzig: L. Voss. 1887. From the Publisher.

The Buyers' and Sellers' Guide on Profit and Return. By Andrew Ferguson. Tenth Edition. London: Effingham Wilson.

Experimental Chemistry for Junior Students. By J. Emerson Reynolds, M.D., F.R.S., F.C.S. Part IV. Chemistry of Carbon Compounds, or Organic Chemistry. London: Longmans, Green and Co. 1887. From the Publishers.

The Law of Trade Marks. By Newnham Browne. London: J. F. Bennet. 1887. From the Publisher.

Obituary.

Notice has been received of the death of the following:—

On the 2nd of October, Mr. Gilbert Farie, Chemist and Druggist, Bridge of Allan, N. B. Aged 54 years.

On the 15th of October, Mr. William White, Chemist and Druggist, High Street, Paisley. Aged 46 years.

On the 5th of November, Mr. Thomas James Barnett, Chemist and Druggist, late of Tunbridge Wells. Aged 43 years.

On the 9th of November, Mr. Thomas Holt, Chemist and Druggist, Ruddington, near Nottingham. Aged 70 years.

On the 10th of November, Mr. Edwin Reynolds, Chemist and Druggist, Tuxford, Notts. Aged 52 years.

On the 15th of November, Mr. George Muncaster Gass, Chemist and Druggist, Whitehaven. Aged 23 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Appointment of Local Secretaries.

Sir,—I have waited a little time, hoping that some one might express on opinion upon the idea put forward by Mr. Roper, in a recent contribution to the Journal. However, like many other weighty suggestions, it seems likely to fall short of its aim, unless we may consider the discussion at the last Council meeting, upon the point raised by Mr. Symes, as having been a result of it.

That the Executive of the Pharmaceutical Society should be as closely as possible in touch with all the members and associates is self-evident, but it is not so evident how it may attain this end completely, and reach those located in the more distant parts of the country equally with those nearer head-quarters. And yet this should be done to a much greater extent than is now the case.

The utilization of the provincial associations for this purpose at once suggests itself as the readiest method of affecting some such result, and the appointment of men as local secretaries who have influence in these, and who can work in harmony with the members, is a matter of the first importance.

I do not quite agree with your correspondent as to the advisability of the frequent changes which he proposes as a means of enlisting more general support and sympathy. Until the right man is found frequent experimental changes most certainly are desirable; but when at length someone accepts the post who combines the ability to work with the desire to advance pharmacy on purely altruistic lines, who is content to abnegate self if but the good cause prospers, let him retain the appointment as long as he can be induced to do so. But do let us be freed from those pharmaceutical wet blankets, whom no apprentices can respect, no assistants support, no principals trust and look to for advice and help in their efforts to struggle upwards. We want men and not talking machines; we need workers, not idlers, who openly express sympathy with us whilst they remain apathetic, or, even worse, secretly oppose obstacles to progress.

Personally I look for a time when flourishing provincial associations will be the rule, and when some measure of federation will be resolved upon, so that each such combination will be in reality a branch of the main society, and connection with that society will entitle one to participate in all the advantages of all or any of the local associations.

Sheffield. John Humphrey.

Apprenticeship in Pharmacy.

Sir,—The leading article in your last issue treats of a subject which should be of considerable interest to most of its readers, whether masters, assistants or apprentices.

The matter was broached a few months ago by a letter appearing in your columns, and hailing from Sheffield.

Yet, of the seven thousand pharmacists and others to whom the Journal finds its way, apparently only one was sufficiently interested to make reply or comment.

To some, that letter may have been hardly palatable; others possibly, foreseeing the enormous revolution in the existing state of things that would have to be brought about ere the promises of the indenture could faithfully be performed, despaired of the task and remained silent.

However that may be, it must be admitted that the subject is at least worthy of ventilation, and as it has once more been ably brought to the front, it is to be hoped that the promised succeeding articles will command as much interest as would a suggestion of a method of keeping up the price of patents or other similar trade item, and be the means of benefiting others as well as—

Deanite.

Assistant Associates.

Sir,—The question of Assistant Associates having a voice in pharmaceutical affairs is a question which has not hitherto received the amount of attention it deserves. Whether this is due to apathy on the part of those it most intimately concerns, or a willing neglect on the part of those having the power to decide, it is difficult to say; both causes may go to account for the door still remaining shut against us. True, we have been admitted into the outer court by becoming associates of the Society, but there we remain with the conviction in our minds that we are unworthy to enter in.

Now let us consider our position in this outer court. What part do we take in pharmaceutical politics? Are we not inactive members, possessing latent energy, no doubt, but still in a state of suspended animation, associates merely in name, and possessing no more power over the destiny of pharmaceutical affairs than those outside the Society altogether?

I hold it as a glaring anomaly that a line should be drawn between associates in business and associates not in business. The former may have more at stake, but candidates on passing the Minor examination are at the time of life when they take the greatest interest in their profession, and it cannot surely be argued that they would exercise the powers conferred upon them in any other way than in furthering the best interests of the Society and the welfare of those already in business.

It is a discordant truth, and must be a disagreeable fact to members of Council, to remember that the Pharmaceutical Society represents only about one-sixth of the great mass of pharmacists throughout the country, and still no inducement is held out for recruits to join it. A prevalent idea, and a most erroneous one, among young men is, that the Pharmaceutical Society is a harsh, dominant, arbitrary body—in short, an enemy, with which they must come into dire conflict before passing on to act their part as responsible members of society.

First impressions, though sometimes wrong, are apt to linger, and perhaps the fact of the duties of examination being vested with the Pharmaceutical Society accounts to a great extent for this coldness on the part of those who ought to be its most zealous supporters.

It is a hopeful sign, however, to hear the President of the Society, in his address to the Sheffield Pharmaceutical and Chemical Association, speaking of the desirability of having every chemist and druggist a member of the Pharmaceutical Society. If such is practicable without having recourse to coercion, without interfering with the present voluntary system, the plan would doubtless obtain the hearty support of all connected with pharmacy.

W. S. Turnbull.

The Incidence of the Medicine Duty.

Sir,—In your recent leader you very fairly considered the difficulty and uncertainty of the druggist in putting up a medicine with his name on it—whether the law required him to put a stamp on the same or not. This is but the fringe and outside of the false position in which the chemist is placed at present, by legislation passed at a time when the trade of the country was altogether different from what it is at present. Your correspondent, Mr. Mee, has pointed out a feasible remedy for the injustice the chemist and druggist has for a long time laboured under, viz., the confiscation of the profits of an expensively qualified profession for the purpose of advertising the grocer's business, "Say a *pro rata* license on all medicine dealers and compounders, calculated on the assessment; an import and export duty on all medicines protected by a trade mark, or otherwise proprietary."

This is now no longer confined to patent medicines, but is gradually extending to all drugs outside the poison schedule. It is now most felt in populous districts and large towns, but, with lapse of time, will become general, and extend to every town in the kingdom. This, like every other trade injustice, can only be remedied by combination. Every individual chemist and district association should bring all possible influence to bear on their respective representatives in Parliament, and the district association and the Pharmaceutical Society should bring all the influence they possess to bear on the Chancellor of the Exchequer, who, whatever his politics might be, would readily listen to any proposal simplifying the collection of the tax—a single rather than a double collection, as at present.

Bowdon. J. P. Harrison.

The Irish Pharmacy Act.

Sir,—I would wish to ask the President and Council of the Irish Pharmaceutical Society to explain through the columns of the Journal by what legal authority they intend registering chemists and druggists in Ireland? I quite agree with "A Dublin Pharmaceutical Chemist's" letter in your issue of November 5, and all he states is correct. The Irish Pharmacy Act was framed for the protection and safety of the public, and by its provision chemists and druggists engaged in trade retained the right to retail poisons, but not to compound prescriptions. To abolish such men as incompetent, of whom a perpetuation would be dangerous to the public, I read as the full meaning of the Act, and I hold that any man going into the drug trade since the passing of the Act of 1875 did so with his eyes open, and has only himself to blame for what he calls injustice now. A second grade of men is not necessary in Ireland. And it is a direct violation of faith with its members if the Council of the Irish Pharmaceutical Society entertain such proposals. I would wish to hear what my brother chemists have to say on the subject.

A Westmeath Pharmaceutical Chemist.

W. C. Langton.—Your advertisement and communication have been forwarded to the publishers, who have the entire management of the advertisements.

A. P. S.—The subject has been discussed frequently in these columns, and we think a more opportune time might be chosen for its revival.

L. Ough.—No metal knife should be used in the preparation of citrine ointment or iodide of mercury ointment.

P. S.—The question whether the sign ℥, occurring in a prescription, should be read as meaning 437·5 or 480 grains was, about ten years ago, the subject of a very animated controversy, which you will find recorded in vol. viii. of the present series of this Journal. Eventually it called forth a semi-official communication from the editor of the British Pharmacopæia, in which it was pointed out that the ordinary symbol for the avoirdupois ounce, and that adopted in the B.P., is "oz.," whilst the symbol ℥ was that of the troy or apothecaries' ounce of 480 grains. The writer added that he failed to comprehend how the official sanction to the use, for the sake of convenience, of the symbols ℈ and ʒ, as indicating 20 grains and 60 grains respectively, "could be construed into an authority to use or interpret the symbol ℥ as having any other meaning than that of the troy or apothecaries' ounce of 480 grains." So far authority, and this would appear to cover the ground of your inquiry, but it cannot be doubted that prescribers sometimes fail to recognize the distinctive value of the sign.

Communications, Letters, etc., have been received from Messrs. Hill, Boa, Postans, Smith, Plumbly, Benger, Harrison, Alcock, P. S.

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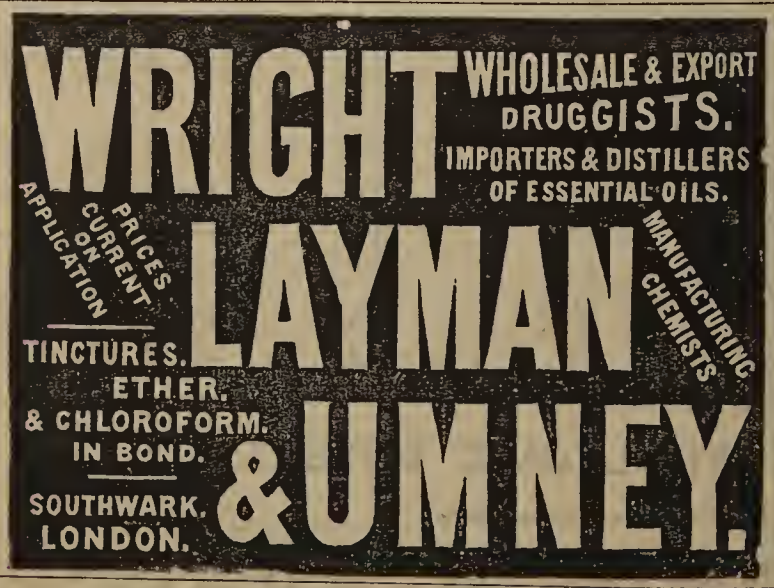

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,, R. Coley.
,, E. B. Dunn.
,, A. E. Fardon.
,, W. G. Gale.
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,, A. F. Heald.
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EARLY in January. As MANAGER or otherwise (with view to purchase) of good class business, returning £250 to £300 profits. North or Midlands. Excellent references. J. E. DEWING, 86, Exeter St., Salisbury.

AS MANAGER with view to succession. Capital about £800. MINOR, care of F. M. Clayton, 55 & 56, Chancery Lane, W. C.

AS ASSISTANT or Branch MANAGER. Age 31. Excellent all round experience. Good references. Disengaged. CITO, Boulton, Derbyshire.

LOCUM TENENS or part time. W. F. CROWTHER, Victoria Chambers, Chancery Lane, W.C.

DISPENSER or Laboratory ASSISTANT. Major qualification. M. P. S., 46, Swan St., S.E.

FRANCE.—As English ASSISTANT (to learn French language and Pharmacy). Qualified. SACCHARIM, 119, Upper Fant Rd., Maidstone.

TEMPORARY MANAGER or ASSISTANT. Many years' experience in London and country. First-class references. Disengaged after the 1st December. CHEMIST, 54, Weltje Rd., Hammersmith, W.

PART-TIME. Varied experience. CHEMICUS, 12, Nelson Sq., Blackfriars Rd., S.E.

ASSISTANT. Age 23. Minor. Good experience. G. S., 59, Shepherdess Walk, Hoxton, N.

MANAGER. Capital Prescriber. Good Salesman. ALPHA, 30, Mathias Rd., South Hornsey.

BY a Registered Chemist as MANAGER of Branch. First-class testimonials. CHEMICUS, 41, Sherwood Rise, Nottingham.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

DISPENSER required at the Great Northern Central Hospital, Caledonian Rd., N. Salary £100 per annum, with partial board. Candidates must be qualified under the Pharmacy Act, and are requested to send in the applications, with copies of testimonials, to the Secretary, on or before November 30th, 1887.

HASTINGS, St. Leonards, & East-Sussex Hospital.—The Committee require the services of a DISPENSER, at a salary of £52 per annum, without board and lodging. The duties of the office can be obtained of the House-Surgeon or Secretary, to whom testimonials, stating age and where last engaged, are to be delivered not later than Friday, the 2nd December. WILLIAM J. GANT, Secretary.
Secretary's Office, Nov., 1887.

JUNIOR ASSISTANT.—A competent Assistant in a large business. About 22. Well up in Dispensing. Minor qualification preferred. Apply to NEELD, care of Messrs. Burgoyne & Co., 16, Coleman St., E.C.

ASSISTANTS WANTED.

JUNIOR for Mixed Country business. In-doors. Short hours, with no Sunday duty. Apply, enclosing photo, to W. H. OMBLER, Market Weighton.

IN a Mixed Country business, a Junior ASSISTANT for the winter months. Time for reading. No Sunday duties. Apply, with usual particulars, to HENRY PICKARD, Chemist, Stratton, North Devon.

CHEMIST (Pharmaceutical preferred). Out-door. Good appearance and address. Thorough knowledge of Retail and Dispensing, principally for former required. Short hours. Enclose copies testimonials, and state references and salary expected, to WM. HARRINGTON & SON (Limited), Cork, Ireland.

SQUIRE & SONS, 413, Oxford St., London, require an ASSISTANT, age about 25, who has passed the Minor Examination, and had good experience in Dispensing. Replies to be addressed to A. H. Squire, 413, Oxford St., London, W.

A COMPETENT ASSISTANT, about 24. Minor. Apply to W. PHILLIPPS & Co., 215, Lewisham High Rd., London.

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CHARLES B. ALLEN, 20, High Rd., Kilburn, requires a qualified ASSISTANT, with town experience. Personal application preferred.

QUALIFIED Senior ASSISTANT, to take charge of a good class country business. Age not under 30. In-doors. Apply, ROGERS, Chemist, Newmarket.

APPRENTICE.—A. R. KEITH, Criterion Buildings, Upper Holloway, has a vacancy for a well educated youth as Apprentice. Comfortable home and a good opportunity of acquiring a thorough knowledge of the business in all its departments.

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AN in-door and out-door ASSISTANT with good experience and address. Send full particulars as to ability and salary required to JAMES STEWART, 389, High St., Cheltenham.

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ENERGETIC, trustworthy Senior ASSISTANT, indoor, good address and business habits. Good writer and Counterman, and desirous of permanency. Accustomed to country trade, and competent to take charge in absence of principal. Abstainer preferred. State age, height, references, salary required. Applications unanswered in three days declined. FLEEMING, Chemist, Wolverhampton.

ASSISTANT, about 22 years. Reliable Dispenser. Preference given to a Minor man. Apply personally, or, if by letter, enclose carte and usual particulars, to MAJOR, 79, Abbey Rd., St. John's Wood.

IMMEDIATELY. An ASSISTANT, used to good class Dispensing business. Apply, G. B., 2, Osnaburgh St., Regent's Park, N.W.

COMPETENT DISPENSER, by end of December, in a good class business. In-doors. Apply full particulars, IPECAC, care of Southall Bros. & Barclay, Birmingham.

ASSISTANTS WANTED.

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JUNIOR. Out-door. Must be an accurate Dispenser, good counterman, and accustomed to a country business. State age, references, salary, and enclose carte, to J. W. NEWTON, Chemist, Salisbury.

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SOUTH COAST.—Dispensing, light Retail and PRESCRIBING. Returns under assistant £700. Splendid position, and capable of being doubled. Price £600.

LINCOLNSHIRE.—Light Retail, Prescribing and DISPENSING. Returns over £700. Valuation about £400.

WALES, S.—Light Retail, in principal street of large town. Returns £800. Excellent opportunity for Shipping trade or Dentistry.

NORTH MIDLANDS.—Good class RETAIL, with Surgeon's Wholesale. Returns now £2800; have been larger, and can be doubled by energetic man. Valuation £2000 to £2500, part of which can remain.

SUFFOLK.—Good class light Retail, Prescribing and DISPENSING, in pleasant town. Returns £750. Ample scope for Agricultural trade, which has not been sought. Goodwill £100. Stock and fixtures at valuation.

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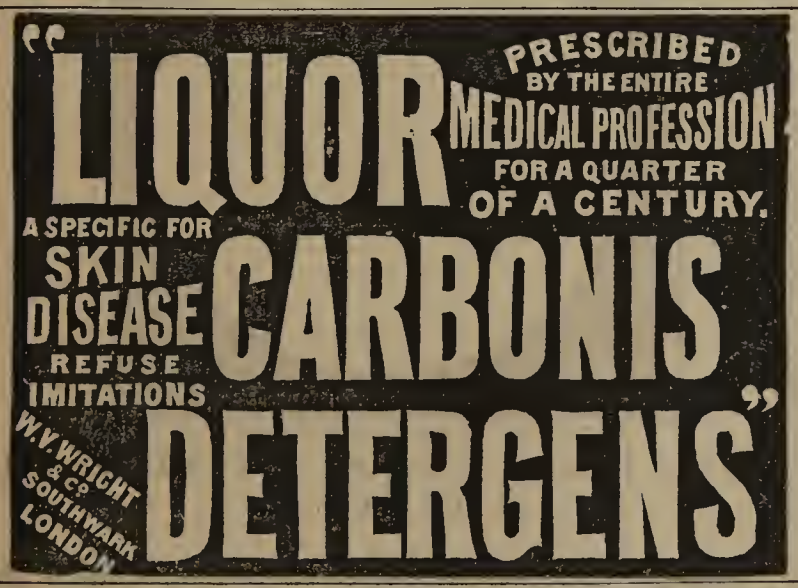
Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.



PIANO.—Advantageous offer. Magnificent 60 guinea Upright Iron Grand (cottage size). Very latest improvements, double overstrung, self-repeating check action, solid brass tuning plate, registered ivory keys, fine burr walnut and gold case, splendid tone, perfect touch, condition nearly new. Guarantee for 12 years transferred. Owner requiring ready cash will accept 26 guineas, and send on approval, packed and carriage paid. PIANO, 5, Clapham Park Rd., S.W.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

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3. HOME COUNTY.—Within easy distance of London. Attractive locality. Good class BUSINESS for immediate disposal. Returns at present at the rate of £1000 yearly. Well fitted shop and good stock. Price £750.
4. KENT.—Near town. Good class Retail and increasing BUSINESS. Returns at present over £900 a year. Large house and good stock. Handsomely fitted shop. Price about £875, to include some house fixtures. £500 paid down, remainder as may be arranged.
5. EASTERN COUNTIES.—Good town. Retail and Dispensing BUSINESS, with some Prescribing. Returns last year nearly £600. Large 8-roomed house. Rent £55. Good garden and warehouse. Price £430.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

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Terms for valuation on application.

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GOOD class BUSINESSES (Main and Branch shop) for immediate disposal. Gross returns £2640.

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Photo-Micrographs.

WELL-KNOWN EMULSIONS AND KEPLER'S SOLUTION of COD LIVER OIL.*

(MAGNIFIED 400 DIAMETERS.)

"It has recently been discovered by Kepler that cod liver oil is capable of being taken into solution.'—BRITISH MEDICAL JOURNAL.

Cod liver oil alone often deranges the digestive organs and sometimes causes vomiting and diarrhœa.

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This plate represents the appearance of a well-known emulsion of the market. The segments show how slightly the oil has been affected. What possible value can there be in such an emulsion?

THE EMULSION OF COD LIVER OIL AND MILK IN THE MARKET.

The manufacturers claim that the preparation which this plate represents is the most finely divided *emulsion* of cod liver oil in the market.

* 'Pharmacologists and practical physicians have long desired to obtain a true solution of cod liver oil in malt, but the difficulties in the way of its accomplishment were found to be so great that all attempts to manufacture such a product were temporarily abandoned. The question has, however, at last been solved. . . . . This new preparation is known as the Kepler Solution of Cod Liver Oil in Malt. . . . *Its superiority as a therapeutic agent, especially in cases of wasting diseases, is obvious.*"—THE LANCET.

"This is an ideal form for administration of fat."—BRITISH MEDICAL JOURNAL.

Inasmuch as the small circles depict the milk globules, the size of the others indicates very plainly the indigestible condition of the cod liver oil. Moreover, separation characteristically takes place in this emulsion. The milk is unstable, and preserved with sugar.

The two foregoing, though representative emulsions, are clearly among the most indigestible of foods, while the following are of an entirely opposite nature—easy to digest and highly assimilable.

A SPECIMEN OF PURE MILK.

These tiny rings show the microscopical appearances of a specimen of fresh pure milk. The fat in milk is in a most digestible form, for it is borne by the most delicate of infant stomachs. Milk itself is a most assimilable food.

KEPLER PERFECT SOLUTION OF COD LIVER OIL IN MALT.

"Under the microscope, no oil globules are visible, and the field is perfectly clear."—BRITISH MEDICAL JOURNAL.

"This is not an *Emulsion;* its constituents are in a condition of more intimate admixture, namely, that of solution."—E. GODWIN CLAYTON, F.C.S.

"It is the most palatable and easily digested of any form for administering cod liver oil."—MEDICAL TIMES AND GAZETTE.

BURROUGHS, WELLCOME & CO.

SNOW HILL BUILDINGS, LONDON, E.C.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

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The

Pharmaceutical Journal

AND

Transactions.

THIRD SERIES, No. 910.] SATURDAY, DECEMBER 3, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

The next EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, December 14th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday next, December 7th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

LIBRARY.

The Library is open daily from 9 a.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.) The Museum is open daily from 9 a.m. until 5 p.m., and from 7 p.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.)

Members, Associates, and Apprentices residing in the Provinces, may obtain books from the LIBRARY on application to the Librarian and payment of carriage one way.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

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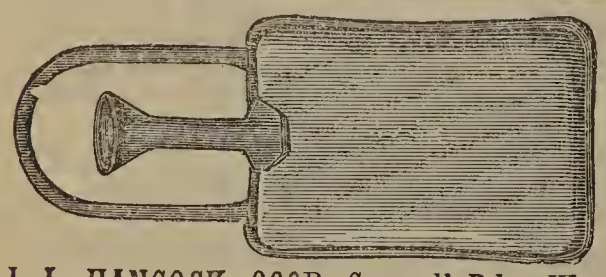

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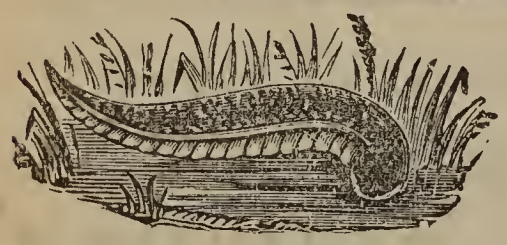

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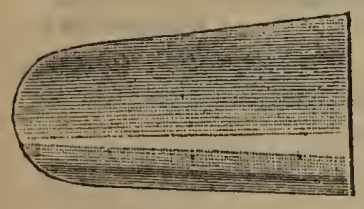

Fig. 5

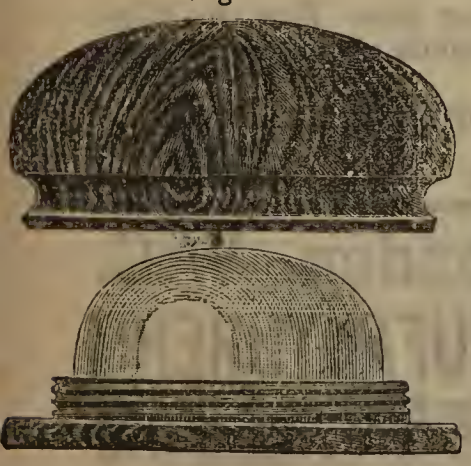

Fig. 1.

Fig. 3.

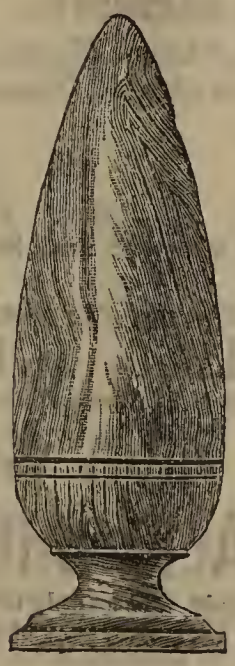

Fig. 4.

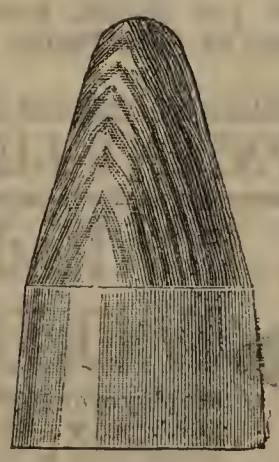

Fig 6.

Fig. 7.

Fig 8.

Fig. 1.	In Ebony Cases, flat for the pocket .. .. per doz.	6/-
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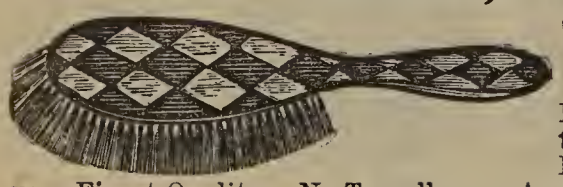

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STERN'S PUMILINE, after careful analysis by competent authorities, is proved to be the **Pure Essence** and the **Pure Extract** of the **Pumilio Pines** grown on the higher altitudes of the Alps in regions of perpetual snow, and an acknowledged remedy for **Gout, Rheumatism, Throat** and **Chest Affections.**

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Pepsin (Fairchild) is supplied in the form of *scales for making solutions* and general manufacturing purposes, in the form of *powder for dispensing*, and in *Tabloids* [1 gr. each] *for easy administration to fastidious patients*. The Fairchild Pepsin is rapidly superseding the ordinary pepsins, many of which are utterly worthless. Fairchild's Pepsin is no more expensive than most of the common pepsins, though it possesses many times the strength and activity.

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,, Pepsin Powdered	¼-oz. ,,	2/0	20/0
,, ,, ,,	1-oz. ,,	6/0	60/0
,, Pepsin Tabloids (1 gr.)	25 in bottle	1/6	14/0
,, ,, ,,	100 ,,	4/6	42/0

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Reply to Circular of Mr CLARKE'S Solicitors.

MR. CLARKE'S SOLICITORS OMIT TO STATE THE FACT THAT OUR CLIENTS, MESSRS. JOHN BEEDZLER & CO., OF "THE GOLDEN KEYE," 18, NORTON FOLGATE, LONDON, E.C., ARE TAKING PROCEEDINGS TO HAVE THE WORDS "BLOOD MIXTURE" REMOVED FROM THE REGISTER OF TRADE MARKS. THE CASE IS COMPLETE AND IS IN THE LIST WAITING ITS TURN TO BE HEARD.

Clarke's circular does not draw attention to the fact that in the cases quoted the Defendants *consented* to the injunctions, which were obtained by arrangement and were not granted after argument in open Court.

Neither does the circular state the fact that in December last Clarke applied for an injunction against Mr. Geddes, a Chemist at Oldham, and that an arrangement was come to by which Mr. Geddes *consented* to an injunction, *but only on condition that Clarke paid Geddes' costs of the action.* At Clarke's instance this was afterwards advertised as a victory.

Can Clarke quote a single contested case in which, after argument in open Court, he has obtained an injunction for infringement of the words "Blood Mixture," unless there has been colourable imitation or other fraud?

Messrs. Beedzler, who deprecate anything in the nature of a fraudulent imitation, contend that the words "Blood Mixture" are not a good trade mark, that they are not fanciful, but are entirely and wholly descriptive of the article to which they are applied, and that there is no name which would more appropriately describe a medicine for the purification of the Blood.

Our clients are supported by:—

Professor Redwood	Professor Attfield
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And by upwards of 130 other leading Chemists in London alone, all of whom are of opinion that the words "Blood Mixture" are words in common use, and purely descriptive of a preparation intended to act upon and purify the blood of a person taking it, and are certainly not fanciful words.

We may add that, for upwards of 80 years past, our clients and their predecessors in business have sold medicine under a descriptive title, of which the words "Blood Mixture" form part.

PLUNKETT & LEADER,

60, St. Paul's Churchyard, London, E.C.

Solicitors for Messrs. JOHN BEEDZLER & CO.

"THE MONTH."

Coca Alkaloids.

The further elucidation of the chemistry of the coca alkaloids furnished by Dr. Hesse's papers on this subject is in many respects a useful contribution. There can now be but little doubt that cocaine is naturally associated with other bases, and that since one of these at least, though isomeric with cocaine, is an uncrystallizable substance forming uncrystallizable salts, there is on the face of the matter much reason for thinking that it ought to be separated from cocaine preparations intended for medicinal use unless it can be satisfactorily shown that its physiological action is identical with that of cocaine. Unfortunately that is a point in regard to which Dr. Hesse has not given much information, and notwithstanding the minute chemical descriptions given of both cocamine and cocaidine he says nothing to indicate that either of these substances possess the same anæsthetic power as cocaine. Another point in which Dr. Hesse's papers on the amorphous alkaloids of coca leaves fall short of being so instructive as they might have been, is the absence of any description of the means by which he found it easy to separate those bases from cocaine. Most other experimenters have found considerable difficulty in effecting such a separation. As regards the volatile base obtained by Dr. Hesse from coca leaves, and considered by him to be the same as that to which Lossen gave the name of hygrine, there appears to be some room for doubt as to whether it should be regarded as a normal constituent, or as a product of the alteration of some one of the bases naturally associated with cocaine. The nature of the volatile base he obtained, also lends probability to the view that it may be a product of decomposition, as its homologue chinoline is in some instances, and the great liability of cocaine to undergo alteration may probably be shared by the other bases accompanying it.

Sodium Sulphibenzoate.

Still another compound has been added to the group of antiseptics, under the name of "sodium sulphibenzoate." It is described by M. Heckel (*Compt. Rend.*, cv., 896) as being prepared by dissolving sodium benzoate in a strong solution of sodium sulphite, and was, in fact, the outcome of an attempt to combine the antiseptic properties of these two salts. The chemical and physical properties of the compound are not mentioned, beyond the statement that it is very soluble in water at the ordinary temperature; it is also affirmed to be absolutely innocuous to the human organism in large doses. But its antiseptic properties are declared to be very considerable, it being reported, as the result of clinical experiments in the hospital of Saint Mandrier, that a solution of sodium sulphibenzoate, in the proportion of 4 or 5 grams to a litre of water, used as an application to wounds, is superior to carbolic acid, and comparable in its good effects to the salts of mercury without their toxicity, or to iodoform without its disagreeable odour.

Naphtol as an Antiseptic Medicine.

For some years past the hydrocarbon β-naphtol has been used in the external treatment of certain affections of the skin, but as a rule it has been looked upon with too much suspicion, on account of its reputed excessive poisonous properties, to allow of it being administered internally. It is true that in 1883 (*Pharm. Journ.*, [3], xiv., 430) Dr. Shoemaker disputed the correctness of this assumption, and attributed any untoward results that might have followed the use of the compound to impurities; but nevertheless the field of the remedy has remained restricted. The subject has, however, been recently revived by M. Bouchard, in a note presented to the Academy of Sciences (*Comptes Rend.*, cv., 702), in which he claims for β-naphtol a superiority in the class of insoluble antiseptics, and states that it is non-poisonous in quantities much greater than those required to produce valuable antiseptic effects in the system, for instance in the intestinal canal. In order to ascertain what was the dose necessary for this purpose a number of comparative experiments were made with different antiseptics upon cultivations of microbes, the organisms found most convenient for observation being two that proved relatively more resistent than any of the ordinary pathogenic microbes, and produced coloured secretions; these were the bacillus that secretes pyocanine and one taken from the intestines of rabbits that secretes a green fluorescent matter. In this way it was found that naphtol added to a cultivation of the pyocyanine organism, in the proportion of 0·40 gram to 1000 grams, exercised a marked antiseptic action, retarding the multiplication of the microbes, whilst those that were developed were no longer capable of forming the coloured secretion; with 0·66 gram of naphtol to 1000 grams the development of organisms nearly entirely ceased. To produce an equal effect to 0·40 gram of naphtol it required 0·025 gram of biniodide of mercury, 2 grams of carbolic acid, 1·6 gram of creasote, 1·27 gram of iodoform, 2·7 gram of iodol, or 1·51 gram of naphtaline. On the other hand, in respect to toxicity, it was found that whilst 0·015 gram of biniodide of mercury, when introduced into the stomach, was sufficient to kill a rabbit, lethal results were not obtained with naphtol until a quantity equal to more than 3·8 grams per kilogram of body weight had been administered. In the case of a man weighing 65 kilograms this would amount to nearly 250 grams, while the quantity required to produce perfect antisepsis in the intestinal canal is estimated at only 2·5 grams daily. Even when injected into the veins, as a one per cent. solution in a mixture of alcohol, glycerine and water, it was found that the toxic dose was 0·40 gram per kilogram of body-weight, or equal to 26 grams for a man weighing 65 kilograms. M. Bouchard argues therefore that if the whole of the 2·5 grams of naphtol required to produce antisepsis in the intestinal canal were absorbed the blood would still receive only one-tenth of a poisonous dose, but that such absorption is very improbable in consequence of the great insolubility of the compound.

Pyocyanine Microbe.

With respect to the pyocyanine organism referred to in the previous note some interesting observations have been made by M. Charrin (*Compt. Rend.*, cv., 758). This organism, which has the peculiarity of emitting in its secretions a coloured compound (pyocyanine) that can be separated in the crystalline form, usually occurs in the bacillus form, but is met with sometimes in an elongated form and sometimes very short, and these differences seem to be coincident with variations in properties. Usually it has been looked upon as a non-pathogenic microbe, but M. Charrin has found that if it be injected into a vein in the ear of a rabbit it is capable of acting with

great virulence, producing albuminuria, diarrhœa, fever, paralytic accidents and death, the microbes being easily recognized in the urine, fæces and viscera. If, however, the rabbit be inoculated with the microbes under the skin of the flank, it is not at first affected by small quantities, though if the inoculation be repeated daily the animal eventually dies; but a rabbit that has been inoculated in the flank is rendered much more resistent to the effects of intra-venous injections. In like manner if a rabbit be first inoculated with sterilized secretion from which all bacilli have been removed the animal shows no ill effects, and if subsequently inoculated intravenously with a virulent dose of the cultivation liquid containing microbes, death does not supervene until after a much longer interval than when the preliminary inoculation is omitted. This therefore would appear to be another instance where a micro-organism secretes a substance which eventually becomes capable of inhibiting its own development.

Phenacetin.

In April last a preliminary note appeared in these columns (vol. xvii., p. 801) on a new antipyretic, to which the names "p-acetphenetidin" and "acetylamidophenol" had been applied. Subsequently (vol. xvii., p. 887) more definite information was given as to the chemical constitution of this compound, from which it appeared to be analogous to antifebrin or acetanilid. The compound, for which the shorter and more convenient name of "phenacetin" has now been chosen, appears to have been since tested therapeutically, and its properties are referred to more in detail (*Pharm. Centralhalle*, Nov. 24, p. 583). It is described as a faintly reddish odourless and tasteless powder, which dissolves with difficulty in water, somewhat better in glycerine, but most freely in alcohol, especially if hot. It is insoluble in acid and alkaline liquids, and experiments as to its solubility in the acid juices of the stomach and in pancreas extract have given only negative results. Professor von Bamberger states that phenacetin administered in doses of 0·5 to 0·7 gram to healthy persons seemed to produce hardly any effect, the influence upon the body temperature being barely perceptible. But when administered to fever patients, even in the relatively small doses of 0·3 to 0·4 gram, it never failed to produce a marked antipyretic effect. In the first tentative experiments doses of only 0·2 to 0·4 gram were administered, which produced a regular fall of temperature, but this was of slight intensity and short duration. As however the safety of the remedy became manifest these doses were increased to 0·6 and 0·7 gram, which quantity has not been observed to produce any disagreeable or injurious symptoms.

Antipyrin in Sea Sickness.

In a note presented to the Academy of Sciences (*Compt. Rend.*, cv., 947), M. Dupuy calls attention to the value of antipyrin as a remedy against sea-sickness. He states that he prescribed to some persons who had previously suffered terribly from sea-sickness, 3 grams daily of antipyrin on the three days previous to embarking and the three days following, whilst some patients continued to take the medicine throughout the voyage, and he has been informed that all these persons crossed the Atlantic without suffering from sea-sickness. This experience was subsequently confirmed in a communication from M. Ossian-Bonnet (*Compt. Rend.*, cv., 1028), who states that in about sixty cases occurring during a voyage to Buenos Ayres and back he found antipyrin invariably effective in arresting sea-sickness, though the dose required was variable. In most cases 1·50 gram was sufficient, the complete effect being produced in about ten minutes. In other cases the dose had to be repeated, but it was never necessary to exceed 3 grams to produce cessation of the sickness within an hour. In a few cases, where the sickness was so incessant as to prevent absorption by the stomach, the same effect was produced by the hypodermic injection of 1 grain of antipyrin.

Peptones.

In a communication on the production of peptone by a chemical reaction (*Compt. Rend.*, cv., 1022), M. Clermont draws a distinction between "medicinal peptones," which have a double value as being nutritive and digestive and purely "alimentary" peptones. Under the former term he includes peptones that are prepared at a temperature below 50° C. by the action of the gastric juice, because it has been found that a good pepsine, after having converted into peptone one hundred times its weight of albuminoids, is still capable of digesting at least another equal quantity upon water being added to the first digestion. The latter term is applied to a product obtained by heating 20 grams of minced meat with 30 grams of water and 0·5 gram of sulphuric acid in a sealed tube, evaporating the resulting liquid, after filtration, to dryness, and treating the residue with water. The solution does not give any precipitate with hydrochloric, acetic or nitric acid; but when diluted with 90° alcohol it gives an abundant precipitate; also with tannin, mercuric chloride and platinic chloride. If the sulphuric acid be omitted from the mixture heated in the sealed tube the product is syntonin, to the exclusion of peptone, into which, however, it is quickly converted under the influence of pepsin in an acidulated medium.

Teleotherapeutics.

On two previous occasions (Oct. 2, 1886, p. 265 and Jan. 29, 1887, p. 608) reference has been made in these columns to the extraordinary statements of some French physicians as to the susceptibility of hypnotized persons to the characteristic physiological influences of drugs brought near to them without their being aware of it. The whole subject of hypnotism seems to be creating a great deal of unhealthy excitement in certain quarters in Paris, which may however find some mitigating recompense in the critical attention that has been consequently directed to the *quasi* contributions to science from this direction. As to the alleged influence of drugs at a distance, as might be expected, crucial experiments have failed to confirm the original statements, the results indicating that any physiological effects produced have been due not to the drugs themselves, but to more or less evident "suggestion" that they were in the neighbourhood of the patient. Thus, at a recent meeting of the Société de Thérapeutique (*Lancet*, Nov. 19, p. 1042), M. Constantin Paul stated that in one case, where a bottle containing alcohol was brought into the presence of a sensitive patient, staggering was produced, but that the bottle was uncorked and the patient evidently smelt the alcohol. In another case, after the contents of a bottle supposed to contain cherry-laurel water had produced the characteristic effects of that medicine, it was discovered that the chemist had made a mistake (?) and filled the bottle with plain water. At a meeting of the Medico-Psychological Society, M. Voisin

gave still more significant instances. Upon applying an empty tube to the back of the neck of a hypnotic subject, with the suggestion that it contained alcohol, symptoms of intoxication were immediately manifested, and similarly the characteristic results of other "suggested" drugs were produced in succession, only an empty tube being used in each case. Two months afterwards the experiment was repeated, empty tubes being again used and M. Voisin merely remarking that the patient would be able to distinguish the drugs, when the physiological effects of the previously suggested drugs were once more produced and in the same order as in the earlier experiment.

Nickel Utensils.

According to Dr. van Hamel Roos (*Rev. Int. Falsif.*, p. 31) the propriety of using cooking utensils coated with nickel is a "burning question" on the continent, the Superior Council of Hygiene in Austria having formally recommended that their use should be legally prohibited. On the other hand, Professor Schulz, of Bonn, states that he has administered to a robust dog daily 500 milligrams of acetate of nickel, until a total amount of 10·5 grams had been taken, the dog remaining perfectly healthy and increasing in weight. Dr. Roos also states that he administered to a dog in the course of thirty-four days 16·926 grams of acetate of nickel, or equal to 5·642 grams of metallic nickel, without any other apparent result than that the dog increased in weight. At an autopsy of this dog no pathological or abnormal symptoms could be recognized, but traces of nickel were found in the liver and kidneys. So far as these experiments go, therefore, they do not disclose any very imperious necessity for legislative interference.

Platinum Sponge.

A vaporising apparatus has been introduced by Herr Onesimus having for its principal constituent platinum sponge and depending for its action upon contact with alcohol, ether or essential oils, which keep it in a state of incandescence after the manner of a platinum sponge glow lamp, the products of the consequent oxidation together with some ozone that is formed, constituting the medicinal agents (*Pharm. Central.*, Nov. 17, p. 174). It is stated that by using the apparatus in a room with alcoholic or ethereal tinctures or substances dissolved in mineral oil very distinct results are obtained in a short time, the most definite effect being obtained in cases of coryza, bronchitis with catarrh, irritation of the mucous membrane of the nose and hay fever. After a few hours, by means of a mixture of alcohol with terpine, turpentine, eucalyptol, or tincture of aconite, the secretion from the mucous membrane is stopped, whilst the respiratory functions are facilitated.

Dammar Resin.

Herr Schweissenger reports (*Pharm. Centralh.*, p. 459) the occurrence of dammar resin adulterated with very small pieces of clear colophony resin. The fragments of colophony were very angular, whilst those of dammar were mostly rounded. When treated with alcohol the colophony dissolved, forming a transparent solution, whilst the dammar at first formed a white turbid layer at the top. The two resins cannot however be separated in this way, since dammar is also partially soluble in alcohol after a time. Herr Schweissenger recommends as the best means of testing such an adulteration the use of the acid number in Kremel's test (*Pharm. Journ.*, [3], xvii., 547), which depends upon the quantity of caustic potash solution required to saturate the free fixed acid in the resin. In the case of the sample reported upon it was found that the acid number of the colophony pieces was 165 and that of the dammar 30·8. As therefore the acid number of the powdered mixture was found to be 62, it was calculated that the dammar was adulterated with about 25 per cent. of colophony.

Syrup of Orange Peel.

M. Leprince, a pharmacien of Bourges, points out in *L'Union Pharmaceutique* (Nov., p. 472) the curious action that mineral acids and certain salts exercise on syrup of orange peel prepared directly from the rind, according to the formula of the Codex. He states that one drop of concentrated phosphoric acid is sufficient to gelatinize 50 grams of the syrup. Monobasic phosphate and lactophosphate of calcium possess the same property, 1 gram of the salt causing the gelatinization of 100 grams of syrup. This change is, he believes, due to the action of the acids on the mucilage derived from the rind. It does not occur in syrup prepared from tincture of orange peel.

Constituents of the Male Fern.

In an interesting paper on the botany and chemistry of the male fern (*Annali di Chimica*, Aug., p. 69) Dr. Gerolamo Doccamo reports that in operating upon large quantities of both dry and fresh Italian grown rhizomes he has separated—besides filicic acid, glucose, tannin, butyric acid, wax, and other previously observed constituents—several new compounds. The first new substance was of a waxy appearance, soluble in boiling alcohol, only slightly soluble in cold alcohol or in ether, insoluble in water and dilute potash solution, melted at 80° C., and had a composition represented by the formula $C_{13}H_{26}O$. It was obtained from the residue from an ethereal extract after it had been treated with a mixture of 1 vol. of ether and 2 vols. of 95° alcohol and subsequently with potash solution to remove filicic acid. From the portion of the ethereal extract soluble in the ether-alcohol mixture another compound was obtained in shining nacreous crystals melting at 136·5° C., which upon analysis gave results corresponding with the formula $C_{20}H_{34}O$, showing that it was probably isomeric with the cinchol, cupreol and quebrachol of Hesse, though differing from all of them in its melting point and somewhat lower lævogyre power. This compound, which has been named "aspidol," is insoluble in water and alkali, very soluble in ether, benzine, chloroform, petroleum spirit and boiling alcohol, and slightly soluble in cold alcohol. It very much resembles cholesterin, especially in the behaviour of a chloroformic solution with sulphuric acid. In addition Dr. Daccomo separated two resins, one as a dull red powder, melting at 85°–93° C., the other of a pitchy consistence. There was also an oily liquid that was fractionated into three portions, one acid in reaction and yellow in colour, distilling between 130° and 190° C., with an irritating odour, the second, distilling between 220° and 290° C., emerald green in colour, and having a composition represented by the formula $C_{27}H_{46}O_2$, and the third, yellow-brown, distilling at above 300°, to which the formula $C_{34}H_{58}O_2$ is attributed. With respect to the essential oil, Dr. Daccomo came to the conclusion that it does not exist ready formed in the plant, since he failed to obtain even a trace of it in the distillation of ten kilograms of fresh rhizomes, although he had pre-

viously obtained it from an ethereal extract of dried rhizomes; he therefore supposes that it is formed by the oxidation of some other principle. It may be remarked, however, that this is contrary to the experience of Schoonbroodt (*Pharmacographia*, 2nd edit., p. 735), who obtained an essential oil from the fresh rhizome, but not from the dried.

Fabiana imbricata.

As a result of a chemical examination of the herbaceous stalks of *Fabiana imbricata*, the Chilian drug which under the name "pichi" was not long ago introduced as a remedy in urinary disorders, Messrs. Nivière and Liotard report (*Journ. Pharm. Chim.*, Nov., p. 389) that they have been unable to find any trace of the alkaloid for which the name fabianine has been proposed (*Pharm. Journ.*, [3], xvi., 722). They are inclined to attribute any therapeutic property the drug may possess to a fluorescent glucosidal principle resembling æsculin.

Vanillin.

In the *American Druggist* (Nov., p. 203) may be found a paper on Vanillin, which tends to show that the flavouring power of the artificial product has been considerably overrated. The author, Mr. Clay W. Holmes, concludes from a series of experiments that instead of 1 ounce of vanillin being equal to 48 or even 24 ounces of vanilla, it is only equal in strength to 16 ounces. He remarks that the American vanillin has a more yellowish tint, although dearer than the French, which is quite white. When the crystals are obtained from vanilla some of the oil invariably adheres to them, and they dissolve rather slowly in alcohol, while those of vanillin show no trace of oil when pressed between paper and dissolve instantly in alcohol.

Oil of Tansy.

A curious effect has been observed by M. Peyraud to result from the administration of oil of tansy, *Tanacetum vulgare* (*Compt. Rend.*, cv., p. 525). The symptoms produced by it in animals almost exactly resemble those of hydrophobia, such as hallucinations, convulsions without loss of consciousness, episthotonos, spasm of the pharyngeal muscles, of the larynx, and of the whole of the thorax, abundant salivation, asphyxial phenomena, sensorial excitability, tendency to bite, the characteristic cry, diminution of sensibility and movement, momentary paralysis, bloody mucous foam from the windwipe and bronchial tubes, subpleural hæmorrhage and hæmorrhagic infarction of the liver.

Verbascum Flowers.

Verbascum flowers are said to be much used in the southern part of Russia in the treatment of itching diseases of the skin. Laschkewitch of Charkov recently tried it in an obstinate case of *Eczema marginatum*, which yielded in four days to the use of a strong infusion, applied three or four times a day to the diseased part. The healing qualities of the plant are said to be noticeable on the second day (*Med. Age*, v., p. 480). The exact species used is not stated. The flowers of *V. Thapsus*, however, are readily obtainable in English commerce, and might be worth a trial.

Canchalagua.

Mr. J. G. Steele in the *Pharmaceutical Record*, November 15, p. 362, gives an account of the various species of Erythræa used in medicine in different countries, classing them under the generic term of Canchalagua, the Chilian name of *Erythræa Chilensis*. He remarks that the latter is used by the natives of Chili as a purifier of the blood, and also as a remedy in pleurisy. Its properties as an aperient and sudorific, and more especially as a tonic in the cure of intermittent fever, are also considered to be of great value. The sudorific property, however, most likely depends partly on the quantity of hot infusion taken.

Orthosiphon stamineus.

Orthosiphon stamineus, which was introduced a short time ago as a remedy in various urinary diseases, is said to be met with in commerce in Germany in the form of rolled leaves like tea. The leaves, when soaked in water and unfolded, are seen to be small, oval and finely toothed, their upper surface deep green, and the lower somewhat lighter. The lateral veins proceed to the margin and follow the latter to the point where they run together. M. Perinelle, in the *Répertoire de Pharmacie*, p. 525, gives the following formula for the tincture:—Leaves finely cut and bruised 1 part, rectified spirit of wine 10 parts. Macerate ten days, express and filter. An extract is made by pouring boiling water on the leaves, allowing them to remain for twenty-four hours, expressing the leaves, macerating them with half the quantity of water originally used, and concentrating the resulting liquors; 195 grams of aqueous extract are obtained from a kilo of the leaves. The extract appears preferable to the tincture, since, according to M. Perinelle, the glucoside orthosiphonin is only slightly soluble in rectified spirit.

Schleichera Trijuga.

The oil of the seeds of *Schleichera trijuga*, a sapindaceous tree growing in India, appears to have recently entered into German commerce under the name of macassar oil, and, according to Messrs. Gehe, proves a very efficient and stimulating agent for the scalp, both cleansing it and promoting the growth of the hair. The tree is common in India, Ceylon, and Burmah, so that there should be no difficulty in obtaining a supply of the oil. It is one of the plants upon which the lac insect feeds, and considerable quantities of shellac are collected from its young branches. The oil of the seeds is used in India chiefly for illuminating purposes, although sometimes employed medicinally for the cure of itch.

Poisoning by Horse Chestnut Rind.

A case of poisoning from eating the green rind of the horse chestnut fruit is recorded by Mr. Solomon (*Brit. Med. Journ.*, (Nov. 19, p. 1101). The patient, a child of between three and four years of age, had dilated pupils, with flushed face and full pulse, and was delirious, waking up every now and then in great terror and screaming. An emetic was given and the child had recovered next morning. Mr. Solomon suggests that the symptoms were due to æsculin, and indicate that æsculin and gelseminic acid are not identical, as has been affirmed.

Salvadora Persica.

In the course of some notes on two routes in the eastern desert of Egypt, Mr. E. A. Floyer (Proc. Roy. Geog. Soc., p. 675) mentions meeting with the *Salvadora Persica*, a species nearly allied to *S. indica*, which is supposed by some to be the mustard tree of the New Testament (Treas. Bot., p. 1011). In Persia the presence of this shrub, according to Mr. Floyer, indicates water underground; he remarks concerning it that "it spreads its twisted branches over the surface until it has accumulated a heap of sand, when it shoots upwards and its hard bright green leaves form a fairly nourishing camel fodder." In

Persia it is called *tooj*, or quince, of which fruit, Mr. Floyer says, the bark has a strong scent. Moslems make tooth-brushes of sticks of this shrub, which was so employed by the Prophet. Dymock, in the 'Materia Medica of Western India,' says that on the coast of Persia known as Garmasir the plant is called "chuch"; also that the tooth-brushes made of the wood are used to strengthen the gums, that the leaves are used for rheumatism and tumours, that the bark has an odour like cress, and that the root bark acts as a vesicant. The shrub appears to prefer salt ground. It possesses properties similar to the Cruciferæ, although belonging to a different natural order.

Patchouli Leaves.

Mr. J. R. Jackson, the Curator of the Kew Museum, remarks (*Gard. Chron.*, Nov. 19, p. 617) concerning a sample of patchouli leaves lately received from Penang, as the result of an experimental trial in cultivating and harvesting the plant, that one sample consisted of the leaves of *Urena lobata*, var. *sinuata*, which it seems is largely used to adulterate patchouli for the market. Mr. Jackson also points out that *Pogostemon suavis*, Tenore (*Kew Journ. Bot.*, 1847, p. 328, t. 11, excl. syn.), and *Plectranthus Patchouli*, Clarke ('Flora of British India,' p. 624), have the same odour. Selected leaves were reported by a firm of manufacturing chemists to be worth £80 to £100 per ton, and the demand for the leaves and essential oil as being steady and continuous. The leaves of *Urena lobata* (of which there is a specimen in the Herbarium of the Pharmaceutical Society) bear a strong resemblance to the second form of adulteration of patchouli leaves, figured by Dr. Paschkis (*Pharm. Journ.*, [3], xi., p. 814, fig. 4), and agree with the latter in the presence of stellate hairs. Dr. Paschkis, however, does not mention the oval slit gland which is characteristic of the leaves of *Urena lobata*, and may be found near the base of the central nerve at the back of the leaf. In true patchouli the hairs of the leaves are all simple and four-celled.

Cubebs.

At the drug sales this month some excellent samples of genuine cubebs were on show, accompanied by others of a pale colour, not unlike that of "yellow berries," and which evidently consisted of the unripe fruit. Both the ripe and the unripe berries gave the beautiful carmine rose colour with concentrated sulphuric acid, characteristic of the genuine drug, but the unripe ones, when bruised and boiled in water, did not give the deep blue coloration with tincture of iodine, although it was readily obtained with the ripe berries. The unripe berries possessed, however, a considerable amount of aroma, and would doubtless yield essential oil on distillation. It would be interesting to know whether this absence of colour on the addition of iodine to the decoction of the unripe fruit is due to the presence of a compound analogous to glycosuccinic acid, which according to Messrs. Brunner and Chuard (*Pharm. Journ.*, [3], xvi., 917) occurs in unripe fruits, and forms with iodine a soluble and colourless compound.

Scented Honey.

At a recent meeting of the Royal Horticultural Society some observations were made on the odour communicated to honey by particular flowers, and Mr. Maclachlan stated that lime flowers give a remarkable flavour to it at Blackheath. Mr. Smee said that the honey from near Mitcham is so strongly flavoured with peppermint as to be uneatable. Professor Church directed attention to the fact that many specimens of scented honey had long been in the Bethnal Green Museum (*Gard. Chron.*, Nov. 19, p. 631). Visitors to the late Colonial Exhibition may have seen in the Canadian section two distinctly flavoured varieties of honey, sold respectively as lime-flower and clover honey, samples of which are now in the Museum of the Pharmaceutical Society.

Schinus molle.

Specimen samples of the fruit of *Schinus molle* have recently been sent to the London market from Columbia on speculation. They are remarkable for their striking resemblance in flavour to a mixture of pepper and fennel. They have however also a slight bitterness and acridity. In Peru and Brazil the fruit is used to make a syrup, vinegar and pleasant drink.

Solanum corniculatum.

At the same meeting, Mr. Ridley exhibited the curious orange-coloured fruit of *Solanum corniculatum*. It is about the size of a hen's egg, with four or five horns proceeding from its base. In the island of Fernando Noronha, where it exists as an introduced plant, it is used for liver complaints.

Germination of Cyclamen.

In the *Gardeners' Chronicle* for November 12, p. 596, Dr. Masters gives illustrations of the curious mode of germination of the cyclamen, showing the way in which some authors have been mistaken in considering the first leaf to be the cotyledon. Dr. Masters expresses the opinion that the greater part of the solitary cotyledon remains constantly within the seed, and that the first leaf is a subsequent production, of which not a trace exists in the seed itself. The tuber or placentiform underground stem is first formed from the caulicle or upper portion of the radicle; the lower part soon disappearing and its place being supplied by adventitious root fibrils from the base of the tuber. The short stalk or petiole of the cotyledon remains attached to the tuber for some time in the form of a minute hooked stalk-like process which ultimately withers and disappears. Sometimes the leaf-stalks of the first two leaves become fused and then look like two cotyledonary leaves, which might deceive an observer who had not seen a series of seeds develop. The mode of germination is thus very different from what usually occurs in other dicotyledons.

Abnormal position of Stamens.

In the same journal (Nov. 5, p. 560) an illustration is given of an abnormal begonia, in which not only does a female flower bear stamens, but they are situated between two divergent open carpels, and appear to replace some of the ovules. The carpels also are partly superior.

Effect of Electric Light on Vegetation.

The electric lighting of the Winter Palace at St. Petersburg appears to have given rise to some unexpected and undesirable results. According to the *Electrician* the sudden change from the sunless days of the northern winter to the blinding light of the banqueting halls, aided probably by the artificially heated and drier atmosphere of the rooms, causes the leaves of the plants used as ornaments to turn yellow, dry up and fall off after being exposed to the light for a single night. The rapidity of the injurious action and its amount is in direct proportion to the intensity of the illumination, since plants partially shaded from the light, or in niches or similar places, were found to remain uninjured.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 3, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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APPRENTICESHIP IN PHARMACY.

SINCE apprenticeship was so closely bound up with the old trading organizations, which cannot by any manner of possibility be nowadays revived, and seeing that the full purpose and benefit of the lesser system was so thoroughly dependent upon the progressive growth of the greater for its achievement, it becomes questionable whether there is any possibility of maintaining the system of apprenticeship as a means of pharmaceutical education. There is therefore some reason for the opinion that it would be better, the parent system having decayed, to abandon the present nominal substitute for a once substantial reality as a useless fiction. Let the name follow the fact of apprenticeship into the limbo of mediæval curiosities. The growth of the principle of individual freedom is opposed to the idea, too, and it would seem as though the master must henceforth sink in the teacher, and that the apprentice, no longer a servant in the true sense of the word, must become a pupil. Formal indentures with their stereotyped and false phrases were best consigned to the museums, and agreements leaving a much greater degree of freedom to all parties concerned might be substituted for them. If at present a principal receives into his charge an idle good-for-nothing youth, after the formal contract is signed he is bound to his ill bargain, and has to make the best of it. Similarly, the youth who is bound to one who entirely neglects him finds that he has practically no redress when, at the end of four or five years, he is released feeling that the time thus spent has been entirely wasted. For, if he obtains a post, the duties of which call for some amount of knowledge and skill, he discovers that he knows little or nothing that he should know and that he must needs begin afresh to learn his trade.

Suppose now that an agreement had been entered into which might be rendered void at any time by mutual consent of the parties entering into the engagement, or at stated times, say at the end of any complete year, at the desire of either one of them, this injustice would be prevented. If the youth felt he could learn yet more under the same employer, and the latter was satisfied, the engagement could be extended for another year. Otherwise they might separate, the one entering upon a new sphere of duty under similar conditions, whilst the other receives a fresh pupil. In this way a lad might study the development of his art in various differently conducted establishments, before he sought to become officially qualified, and a main difficulty of the modern tendency towards specialisation might be overcome. Besides this he could blame none but himself if he chose to remain with an incompetent pharmacist rather than incur the trouble and risk of a change.

Another protection, an indirect, yet a highly practicable one, might be afforded by the Pharmaceutical Society. If the standard of the Preliminary examination could be raised and its scope extended, much good might be effected in combination with the plan just sketched. For a highly educated youth would sooner detect flaws in his principal's attainments and distinguish superficial information from real knowledge than a poor scholar, and so the working of the suggested substitute for apprenticeship would be considerably assisted. In addition to this, however, the modern pharmacist should be a man of many parts, and immeasurably more cultured than, on the average, he now is. The elements of our two fundamental sciences, chemistry and botany, should be expected to form part of the primary school education; an acquaintance with the French and German languages (not the grammars) would be desirable; and some geography and simple geometry would not unduly overburden the syllabus. These extensions might act as a deterrent to many of the incapables who now crowd into our ranks, for it would be more than ever desirable to have this examination over before the business was actually entered upon, and pharmacists might be expected to insist upon this as a condition of receiving pupils, so that the latter could have their observing faculties unfettered by any more scholastic trammels.

A third check to the spread of empiricism lies in the power of the Society as representing the best in pharmacy throughout the land, and this might be imposed without any extra parliamentary authority being invoked. When a pupil has spent a reasonable time in the practice of pharmacy he might present himself to be examined as to his fitness to make and dispense the various classes of remedies. If he satisfied the examiners the Society might grant him a certificate of competency, and all supporters of the Society could refuse to engage anyone as assistant who did not possess such a certificate. Then, in course of time, as the Society became more inclusive, or as outsiders gradually came to recognize the wisdom of this plan, it would be found unprofitable for anyone to neglect opportunities of gaining the required training. Such unwritten laws are always of most permanent use eventually. No external influences can have any lasting influence apart from the spontaneous desires of the individual members of our body in the direction of

progress. These desires, if expressed unanimously, will effect the desired ends much better alone than if hampered by Acts of Parliament, whilst legislative statutes alone can work nothing but confusion.

Perhaps it may be permitted to suggest, in conclusion, in what ways pharmacists who, under existing conditions, cannot give any positive help to those they employ, may assist them indirectly. In the first place, for the youth's sake, no less than their own, they should refuse to receive an apprentice until his school examination is passed. There is an excessive wear of brain tissues induced by studying for this after shop hours, and that, too, at an age when it can be ill afforded. Secondly, a reasonable time should be allowed for attendance at lectures on the various necessary subjects, and an effort should be made, even if some inconvenience be caused, to fit up a small rough laboratory so that there may be opportunity for practice in analysis frequently. When the apprentice can apply his information in the shop he may be allowed to test the entire stock, and thus ensure freedom from some degree of anxiety if the public analyst is disposed to be too zealous. Lastly, if it be impossible to devote any close personal attention to an apprentice and his work, full permission should at least be given to him to help himself and learn all he possibly can; no obstacles should be placed in his path, and he should be encouraged by a kindly word of sympathy now and again. This will cost nothing, but both master and apprentice, and, maybe, even the world will be the better for it.

THE ROYAL SOCIETY.

THE anniversary meeting of the Royal Society on St. Andrew's Day was marked, as usual, by the delivery of an address by the President, Professor GEORGE GABRIEL STOKES, who, after a brief biographical notice of Fellows that have died during the past year, directed attention to the fact that in looking back at the progress of science, the present year is memorable not only as the jubilee of the QUEEN'S reign, but also of the electric telegraph, if its existence be dated from the first actual construction of a telegraph line on a working scale. The industry of the coal tar colours, which has attained such gigantic proportions since the time when PERKINS laid the foundation of it by utilizing for the purpose a colour reaction which had hitherto been employed only as a test for aniline, is an outcome of scientific research that will not for some years to come attain the period of its jubilee, though it has already been so prolific in furnishing a stimulus to chemical investigation. But there is yet another jubilee connected with this year, of still greater interest for the Royal Society, inasmuch as it is now just two hundred years since the publication of the 'Principia' of NEWTON. Looking at the progress of science and its application since that time, and especially during the last half century, speculation might lead to the opinion that the mine of nature must have been worked so far that no great quantity of precious ore can still be left, except what lies too deep for human power to extract. But that very progress is a warning against any such hasty conclusion, when it is remembered how often accessions to our knowledge of an entirely unforseen nature have been made in a manner quite unexpected.

In the distribution of honours this year by the Council of the Royal Society, the COPLEY medal has been awarded to Sir JOSEPH DALTON HOOKER, for his services to botanical science as an investigator, author and traveller; a Royal medal to Colonel CLARKE, R.E., for his comparison of standards of length and determination of the figure of the earth, and one to Professor MOSELEY, for researches in animal morphology; and the DAVY medal has been awarded to Mr. JOHN NEWLANDS for his discovery of the periodic law of the chemical elements. It is curious to note, in connection with this latter award, that in 1882 the DAVY medal was awarded to Professor MENDELEJEFF and LOTHAR MEYER for their discovery of the periodic relations of the atomic weights, now known as the periodic law. It would appear to have taken five years to arrive at a recognition of the fact that their discovery had been anticipated by a countryman of our own.

We may also take this opportunity of mentioning that among those elected as members of the Council are W. T. THISELTON DYER, Director of the Royal Gardens at Kew, and an honorary member of the Pharmaceutical Society, and HENRY BOWMAN BRADY, formerly a member of Council and of the Board of Examiners of the Society.

The *Ormskirk Observer*, of the 24th instant, in reporting that at the Ormskirk Police Court, Walter Fletcher was committed for trial on the charge of having on the 5th of November, at Skelmersdale, set fire to a dwelling house and shop, described the defendant as a "chemist and druggist." We are in a position to state that he is not a "chemist and druggist," and that, on the contrary, he was recently sued by the Society for penalties under section 15 of the Pharmacy Act.

* * *

We understand that the Governors of the North London or University College Hospital have decided to hold a Fancy Dress Ball in aid of the funds of that institution at the Hotel Métropole on the 9th of February next. A Festival Dinner with the same object will also take place at the same hotel early in the following May.

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The next meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, W.C., on Thursday, December 8, at 9 p.m., when an address will be delivered by S. R. Atkins, J.P.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, December 8, when a "Further Note on the Estimation of the Alkaloids of Conium," by Mr. R. A. Cripps, will be read, and a Report on Organic Chemistry will be given by Miss Buchanan.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixteenth general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, November 24, the President, Mr. A. C. Abraham, in the chair.

The minutes of the previous meeting were read and confirmed, and donations were announced of the *Pharmaceutical Journal* from the Society, and the *Canadian Pharmaccutical Journal*, the *British and Colonial Druggist*, and the *Pharmaceutical Record* from the publishers.

The following gentlemen were elected members, viz., Messrs. J. J. Blabey, J. E. Midgley, H. C. Woodhead, T. H. Dodd, T. F. Driver, J. T. Shipton, G. Ellams, R. T. Richardson, R. J. Smith and G. H. Aris.

Chewing Gum.

The President drew attention to the prosecution that had taken place the day previously for the sale of chewing-gum, and said he considered the prosecution harsh and unjust, seeing that chewing-gum cannot be regarded as either a food or a drug. He said that in America the habit of chewing certain substances is very extensively practised, and that of late these chewing-gums have been introduced into this country. They are compositions principally of India rubber, and he did not think that the admixture of paraffin wax could be regarded as an adulteration, under the circumstances.

Messrs. A. H. Samuel and M. Conroy agreed with the President in his remarks, and thought the prosecution vexatious.

A Cork Press.

Mr. B. Dickens showed an American cork press which is of iron, and consists of a wheel revolving in a circular frame. The principal feature is that the space between the wheel and the frame is a section of a cone, so that on putting in a cork and turning the wheel the pressure throughout the entire length of the cork is equal, notwithstanding the tapering of the cork.

The following paper was then read on—

Tinctura Cinchonæ.

BY J. S. WARD, PH.CH.

It has often appeared to me to be highly desirable that we should possess a more extended knowledge of the various pharmaceutical preparations, such as infusions, decoctions, extracts, tinctures, etc., that are still of a somewhat indefinite composition, and especially so in the case of such as are official.

Much good work has already been done in this direction, and in the last edition of our Pharmacopœia several preparations were, for the first time, standardised, or made of a definite strength. There is, however, much room for more work upon this subject, and I have not the slightest doubt but that in the next edition of the B.P. we shall find the list of standardized preparations very greatly extended. But there will still be many that cannot practicably be made of standard strength, and I think, perhaps, that the subject of my paper, "Tinctura Cinchonæ," will probably belong to this class. None the less, I consider it desirable to know how far such an important preparation represents the drug from which it is prepared, and in order to discover this I have made certain experiments, the results of which I propose to bring under your notice.

My object in working out these experiments has really been twofold: 1st, to ascertain how far the official process exhausts the bark; and 2nd, to discover if samples obtained from different sources are at all uniform in composition.

In order to solve the first problem I carefully prepared a tincture from an estimated quill bark. I then took 1 fluid ounce, distilled off the spirit, evaporated the residue to dryness in a tared dish and weighed it, by which I found the amount of matter extracted from the bark by the spirit. I next mixed this extract with a little lime and water, and estimated the amount of total alkaloids contained therein. And, finally, I estimated the amount of alkaloids left in the marc.

The process employed in these estimations is the official one, and in estimating the marc I took as much as represented 400 grains of the original bark, so as to have a fair amount of alkaloids present, and thereby minimise any errors of manipulation, and the results obtained are expressed in the following table:—

	Percentage of Quinine and cinchonidine.	Cinchonine and quinidine.	Total alkaloid.
Original bark .	3·7036	1·2422	4·9458
Exhausted bark .	2·1635	·5941	2·7576
Tincture . . .	[1·5401]	[·6481]	2·2043

Note.—The fluid ounce of tincture contained 32·276 grains of extractive, and 1·939 grains of alkaloids, *vide* following table.

You will observe that the amount of total alkaloids in the exhausted bark *plus* the amount of total alkaloids in the tincture slightly exceeds the quantity found in the original bark. This I can only account for by supposing that the exhausted bark, *i.e.*, the bark minus the resin and extractive matter, yielded its alkaloids somewhat more completely to the benzolated amylic alcohol than the original bark. You will also, if you please, observe that in the case of the tincture I only estimated the amount of total alkaloids, the amount present, from 1 fluid ounce of tincture, being too small to conveniently separate into two portions. I have, however, in the above table for convenience shown approximately the proportions of the alkaloids by subtracting in each case the amount found in the exhausted bark from that found in the original, the results being placed in brackets.

I may remark that the pint of spirit extracted 645½ grains of matter from the 4 ounces of bark, and therefore 252½ grains of the marc represented 400 grains of original bark, and was the quantity taken in estimating it.

In order to ascertain whether tinct. cinchonæ obtained from different sources is fairly uniform in alkaloidal strength and in composition generally, I procured six samples, some from wholesale houses, and others from retail chemists that I know prepare their own tinctures, and submitted them with the one prepared by myself to the following experiments:—

First the specific gravity was taken, then the spirit distilled off, and the amount of alcohol they contained calculated therefrom. Next they were evaporated to dryness in tared dishes, and the amount of extractive ascertained, and finally the amount of alkaloids in each was estimated. The following table shows the results of these experiments.

Tinctures.

	Specific gravity.	Extractive from 1 fluid ounce. Grains.	Total alkaloids from 1 fluid ounce. Grains.	Percentage of alcohol.
No. 1 . .	0·9520	32·2763	1·9398	44
„ 2 . .	0·9426	29·0893	1·6975	46½
„ 3 . .	0·9423	24·2282	1·7129	45
„ 4 . .	0·9488	29·9380	1·8827	48
„ 5 . .	0·9411	20·3362	0·7716	45½
„ 6 . .	0·9557	31·6818	1·7129	41
„ 7 . .	0·9515	35·4936	0·9876	45½

Note.—No. 1 is the tincture specially prepared by myself for these experiments.

The inferences to be drawn from these results are—

1st. When tinctura cinchonæ is prepared in exact accordance with the official process,—the bark and the spirit being of standard strength,—only 44·27 per cent. of the total alkaloids of the bark are extracted; further the different alkaloids are not equally dissolved, for only 41·49 per cent. of the quinine and cinchonidine is extracted whilst the quinidine and cinchonine taken out amounts to 52·10 per cent.

2nd. There is no relation between the amount of extractive and the amount of alkaloids contained in the tincture.

In conclusion, I may remark that I consider the tinctures examined were fairly uniform in strength (excepting Nos. 5 and 7), and that I was somewhat surprised to find that the distillate in nearly every case showed a deficiency of 4 per cent or 5 per cent. of alcohol below proof spirit. I was especially surprised at this in the case of No. 1, because I took the specific gravity of the spirit with which I made the tincture and found it correct.

Mr. Conroy in proposing a vote of thanks to Mr. Ward observed that similar experiments had been made by Messrs. Hogg and Braithwaite some years ago upon the tincture made from the yellow bark. He thought the deficiency in alcoholic strength might be accounted for by the amount of moisture in the bark.

The vote of thanks was seconded by Mr. A. H. Samuel, supported by Mr. B. Dickens and by the President, who said that he was somewhat surprised that Mr. Ward had found such a large percentage of quinine and cinchonidine in the bark. With regard to the percentage of alcohol in the distillate the volume occupied by the extractive in the tincture would affect it somewhat, probably to 2 per cent.

The vote having been put to the meeting and carried, Mr. Ward briefly replied to the criticisms, and the meeting terminated.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The second monthly meeting was held at the Grand Hotel, Colmore Row, Birmingham, on Thursday evening, November 24. Mr. G. E. Perry, President, in the chair.

The following series of short papers were read:—(1) "A New Form of Percolator," by the President. (2) "Remarks on Dentifrices," by Mr. T. Elliott. (3) "Note on Methylated Ether," by F. H. Alcock, F.C.S.

In the first paper Mr. Perry described what were claimed to be the advantages of a new form of percolator, which is long in proportion to its diameter, it having a depth five times its greatest diameter. It is therefore more elongated than the U.S.P. percolator, and is not quite so conical. It also differs in having a regular tincture bottle neck, into which the cork can be inserted in the ordinary way from the outside.

A short discussion ensued, in which Messrs. Arblaster, Bevan and Barclay took part.

In some "Remarks on Dentifrices," which in the absence of the author was read by the Secretary, Mr. Elliott said that cleaning the teeth with water was not sufficient to maintain the healthy state of the teeth and mouth, and described the means adopted by less civilized people in order to preserve a good appearance of the teeth and a healthy condition of the mouth. He strongly condemned the use of soot and charcoal, and pointed out that this caused a kind of tattoo mark beneath the surface of the gum. He recommended the use of common salt and spoke highly of its value as a dentifrice; the occasional use of pumice powder was not detrimental, but the persistent use of astringents was very unwise. In the case of liquids and pastes, an aromatic and antiseptic oil was a good addition when combined with a small quantity of an alkaline substance. He thought that care should be exercised in getting a tooth brush, the hardness of which was suitable to the person's mouth who was to use it.

There was no discussion.

In Mr. Alcock's note on a sample of methylated ether, the author said that on adding some methylated ether, which he had in his laboratory, to an equal volume of pure and strong sulphuric acid, it gave a deep red brown colour, which colour was not obtained when a sample of pure ether was similarly treated. He suggested that that reaction might possibly prove useful as a means of distinguishing the two varieties of ether, as ordinarily sold under the names of "methylated" and "pure" in commerce.

In the discussion which followed,

Mr. Brewis thought that probably the coloration was due to acetone or compounds of allyl; it would not be due to methylic ether, seeing that was so volatile.

Mr. Barclay hoped that Mr. Alcock would continue his experiments, for if an easy test could be provided which would distinguish the two ethers it would be a decided advantage. It was very difficult to get pure ether.

Mr. Prosser asked if ether dissolved bees' wax, because he had some wax a few days ago which resisted the solvent action of ether.

Mr. Lloyd asked if pure sulphuric acid had been used in the experiment.

Mr. Perry thought that possibly the colour might be due to the presence of a trace of ethyl nitrite.

Mr. Alcock replied to the several points raised in the discussion.

Mr. Perry then explained the action of some new dispensing scales which Messrs. Rogers and Sons had kindly sent for the inspection of the members.

At the conclusion of the meeting,

Mr. Barclay, in a few happy and well chosen words, proposed that the hearty congratulations of the members of the Association be offered to the President on the occasion of his marriage. This was seconded by Mr. Prosser, and supported by Mr. Thompson, after which Mr. Perry suitably replied.

There was a good attendance of members.

Dr. Tilden's experiments were postponed to a future meeting.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the tenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, November 23, at 9.15 p.m., Mr. George Lunan, President, in the chair.

The minutes of the previous meeting having been read and approved, the Chairman called upon Mr. James Mackenzie to read the following—

Notes on Practical Pharmacy.

BY JAMES MACKENZIE.

The subject of practical pharmacy is one which is deserving of the closest study and investigation, for it is of vital importance to the pharmacist that he should have an intelligent and practical idea to guide him in his manipulation, and enable him to combine in his preparations elegance and efficiency. Pharmacy is the term applied to the methods by which drugs are prepared for administration, and by practical pharmacy I mean those methods which commend themselves by reason of their efficiency and economy. These processes emanate from the minds of practical men who have an intimate knowledge of the substances in question, and can generally be distinguished by their containing no superfluous directions, and accomplishing their object in the shortest possible time and with the least possible expense. Of course we must make due allowance for the fact that it is much more easy, when a certain formula is given, to improve upon that formula than to devise a new one altogether, especially as the pharmacist in actual practice would see wherein the weakness of the given formula lay. Practical pharmacy, however, embraces other points than those having relation to manipulation, and in the notes that I am to submit for your consideration to-night I intend to treat the subject in a general way in as far as it can be made to comprehend the desirability of having standard preparations, so as to ensure the uniformity of their strength, with sug-

gestions on official formulæ, and a few notes on one or two commercial samples of drugs.

First, then, touching the uniformity of the strength of preparations, I consider this an object very desirable to attain, as it is a matter of great importance to the legitimate pharmacist that he should have the entire confidence alike of the public and the prescriber. I deprecate all those preparations which are of uncertain strength. For instance, *Extract of Aconite* is a powerful preparation, the B.P. dose being from a $\frac{1}{4}$ to 1 grain. It is one of the green extracts, and the direction at the end of the process for its preparation is, that it shall be evaporated until the extract is of a suitable consistence for forming pills. Now, I do not think that this is as it ought to be, and that for various reasons. First, there is no necessity for it being a soft extract at all, because, unlike extractum gentianæ or extractum taraxaci, it is never prescribed in such quantity as that it would be an excipient for a pill, and in the quantities in which it is prescribed the effect of its excipient power is "neither here nor there." Secondly, as it is but seldom prescribed, a small quantity of it is generally sufficient stock to last for a considerable time. The consequence of this is that by evaporation the extract gets hard, and, of course, more concentrated, so much so, that if it is dispensed in this hardened condition, without allowing for loss of moisture, there is a danger of it interfering with the therapeutic effect calculated upon by the prescriber. Now, I would endeavour to remedy this defect and perfect this preparation by making it take a different form, having for my model the abstracts of the U. S. Pharmacopœia. I would not have it a green extract at all. The presence of a fine green colour is certainly a guarantee that it has received careful treatment before the chlorophyll has been removed, and after it has been again added, but that is all. In making the extract I would exhaust the plant of its active principles by the most approved method of percolation. Mix the percolate with an inert substance, say sugar of milk, and allow it to dry, then mix the product intimately with sufficient sugar of milk so that the finished product would either contain a certain percentage of alkaloid or have a definite relation to the amount of crude drug used. An extract prepared thus would remain constant in strength.

Extract of Opium I would also have in the form of an unalterable extract. I have seen several samples of this drug lately, and almost without exception they have been quite hard and unworkable, and, as I said before, this loss of moisture affects the alkaloidal strength of the preparation, so that there is a distinct call for something being done to make the preparation more perfect.

I think *Extractum Cascara Sagrada* should also be in the form of a powder,—that is, that it should be directed to be evaporated to dryness,—for however desirable the theory may appear of having it of such a consistence that you can weigh a dram and immediately roll it off into a dozen five-grain pills, it will not do in practice, or if it is done, for a dead certainty it will be returned by the customer, not as the dozen pills but as the dram of extract. There is just the possibility that owing to the hygroscopic nature of this preparation it might not retain its form as a powder but get into a hard mass, so that in the meantime, when cascara sagrada pills are ordered, I suggest that the extract should be weighed, carefully evaporated to dryness, and a few drops of spirit added as an excipient, when a good pill can be turned out. Great care, however, has to be observed so as not to add too much spirit.

I look upon *Ext. Nucis Vomicæ* as a splendid preparation, and upon the principle involving the standardizing of its strength as a big stride in the direction of true practical pharmacy. The extract is definite in itself, and it also gives a definite tincture, and the presence of these definite preparations in the Pharmacopœia cannot fail to have a beneficial effect, inasmuch as they will attract the attention of pharmacists, who will thus be stimulated to emulate a good example, and latent talent will be called into action and brought to bear upon other preparations, and methods for standardizing them will be worked out and agitated for until they be made official. It is simply ridiculous and a reflection upon the pharmacy of the nineteenth century that we should be entirely ignorant of the strength of any preparation whatever passing out of our hands.

The juices of the B.P. are also preparations of an unsatisfactory nature. The directions given for their preparations are: to bruise in a stone mortar, press out the juice, and to every three measures of juice obtained add one measure of rectified spirit. The intention in this case is evidently to get the active principles in the condition in which they naturally exist in the plant, but there is no attempt made to ascertain the amount of moisture contained in the plant, and it is evident that the plant being more or less succulent would have an important bearing on the strength of the juice obtained. For instance, the plant may have been grown in a shady place or in a damp soil, and, consequently, on expression would yield a large amount of juice. On the other hand, the plant may have been grown on sandy soil, and before cutting this plant the weather may have been dry, so that it would not contain much sap, and on expression it would not give a large supply of juice, but what it did yield would be of a more concentrated nature than in the case of the plant grown in damp soil. Now methods have been devised whereby it is perfectly practicable to accurately estimate the strength of the juices, and in the interests of the dignity of our calling these methods ought to have official recognition, and the finished products thereby adjusted to a definite strength, for as they at present stand the succi of the British Pharmacopœia are a reproach to pharmacy.

Take the case of *Succus Belladonnæ* as an instance. The juice is prepared from the fresh leaves and young branches of *Atropa Belladonna*. The leaves are the part of the plant richest in alkaloid. Chalky soil has also been proved to favour the development of atropine. Wild plants are also richer in alkaloid than cultivated plants, therefore it follows that in making the juice, the proportion of leaves to young branches used, the nature of the soil upon which the plant has been grown, and whether the plant has been wild or cultivated, will all tend to influence the strength of the product. I have examined three samples of *Succus Belladonnæ*, obtained from different sources, the results of the estimations being as follows:—

No. 1, 50 c.c. gave only a trace of atropine. No. 2, 50 c.c. gave ·03 grams, equal to 0·06 per cent. by volume. No. 3, 50 c.c. gave ·025 grams, equal to 0·05 per cent. by volume. No. 1 was repeatedly estimated with unvarying result. In appearance it was very dark and contained a heavy deposit. Nos. 2 and 3 are samples of a fair average strength. The method adopted for the estimations was that devised by Messrs. Dunstan and Ransom (*Pharm. Journ.*, [3], xvii., 844).

In saying a few words upon the tinctures of the B.P., I feel that I am touching upon a subject which would prove a very fruitful field for research, and would amply repay for time and attention devoted to it. In the formula for a tincture there are three main points which have to be taken into consideration. First, the amount of drug which a certain quantity of menstruum can exhaust. Second, the menstruum best adapted for extracting and retaining the virtue of the drug in question, and third, the most efficient method of exhaustion to be employed, whether maceration or percolation or both. At present, with a few exceptions, the tinctures of the B.P. do not show much evidence of careful consideration having been given as to the menstruum best adapted to each.

The Pharmacopæia contains the rectified spirit and the proof spirit, and in cases where it is not necessary to use rectified spirit proof spirit is ordered as if it were the

only alternative. Now this is not the proper thing, and I urge the necessity for having the formula for the tinctures entirely reconstructed. Careful experiments ought to be conducted so as to ascertain the strength of spirit most suited to each drug. The amount of spirit ordered in some cases is not only unnecessary and wasteful, but also contrary to the proper exhaustion of the drug. In these days of keen competition, the practice of economy ought to hold a high place in pharmaceutical preparations, and when a weaker spirit than proof would answer the purpose perfectly, then it ought to be ordered accordingly. No official formula that was ever concocted can justify waste, and I hold that the amount of spirit ordered in some tinctures is a painful waste, inasmuch as it is a loss to the manufacturer without being any benefit to the customer.

Tincture of Opium is an instance in which the amount of spirit ordered has a detrimental effect upon the preparation. Equal parts of spirit and water forms a much better menstruum, the morphine being more readily soluble in this mixture than in proof spirit. By the B.P. process for making the tincture the opium is never thoroughly exhausted. I have examined marc obtained from several ounces, and in each sample I ascertained the presence of morphine. In my experiments I adopted the B.P. method for the assay of opium.

In the directions given for the preparation of *Tincture of Myrrh* the maceration part of the process is quite useless. Maceration is only resorted to in cases where there is tissue to penetrate ; but tincture of myrrh can be made right away by simply percolating the rectified spirit through it, inasmuch as this is quite sufficient to dissolve the resin contained in the myrrh.

Tinct. Opii Ammon. is directed to be macerated for seven days. This is a great waste of time. It is the powder of opium that is ordered, and the quantity of menstruum is relatively large, so that three days' maceration is ample time for its exhaustion.

It was my original intention to have gone more fully into the subject of the amount of spirit ordered in tinctures, and make a few practical suggestions to-night, because I am so convinced of the necessity for a reformation in this direction; but I soon realised that the amount of work entailed and the amount of time at my disposal would not permit of me taking it up under the pretence of working it out, or doing anything like justice to it. I have here one or two specimens of tinctures made with diluted alcohol, and you may pass your own judgment on them, but I refrain from citing them as proving any particular point, because I have not had an opportunity of estimating and comparing them with the B.P. preparations. But granting that they were only equal in the amount of substance they contained in solution, then the balance is in favour of the economical method.

In reference to *Opium, B.P.*, I think it is unfortunate that its percentage strength in morphine should have been so much restricted, for as it at present stands the B.P. standard excludes some of the finest classes of opium that can be obtained. The money value of opium should be in a definite ratio to its alkaloidal strength. With the present standard a fair sample of opium commands a fancy price, because it is of B.P. strength. I am strongly in favour of standard preparations, but however desirable it is to have drugs of a standard strength, still it is not true practical pharmacy to make a standard which interferes with the market value of a genuine produce.

In passing from official to unofficial subjects, I beg to add my testimony to the adverse criticism which has been passed upon the B.P.C. *Emulsio Olei Morrhuæ*. The formula for this emulsion is without doubt a failure. The product it gives is neither beautiful to gaze upon, nor pleasant to the palate. I have a sample of it here which has been prepared for more than three weeks, and although there is no sign of separation, still it cannot be said to be an emulsion proper. Oil globules are distinctly visible in it to the naked eye.

I have formulated a recipe for an emulsion which appears to give a very satisfactory result. The recipe is as follows :—

Take of—

Gum tragacanth	1 drachm.
Gum acacia (powdered)	1½ drachms.
Bermuda arrowroot	1 drachm.
Cod liver oil.	6 ounces.
Water.	6 „
Spirit of chloroform	1 drachm.
Saccharin	3 grains.
Oil of cassia.	9 minims.

Put the powders in a dry mortar, add a little of the oil, and rub well together until it has a creamy appearance, then add the remainder of the oil. When the powders are well diffused throughout the oil add the water all at once and use the pestle diligently until the emulsion is formed. Dissolve the saccharin in the spirit of chloroform, and to the solution formed add the oil of cassia ; incorporate this in the emulsion.

Although in the formula I say spirit of chloroform, I recommend that the saccharin be dissolved in 1 drachm of rectified spirit by the aid of a gentle heat, the solution cooled, and three drops of chloroform added with the oil of cassia. The reason for this recommendation is evident. The points of this emulsion are that it is beautifully white, of a nice consistence, contains 50 per cent. of oil, and is pleasant to the palate.

In drawing out this formula, I thought I was making a new departure by including saccharin. The presence of the saccharin and the chloroform fulfil a twofold object, inasmuch as they are both powerful sweetening and antiseptic agents. I therefore calculated upon having something new to show you, but you will have seen by the *Pharmaceutical Journal* of November 19 that I have been anticipated by Mr. A. W. Gerrard. I had my experiments worked out, however, before the appearance of his paper, and give you the result unaltered.

What I consider a great objection to the formula given by Mr. Gerrard is the amount of gum acacia he orders. Gum acacia is said to be very indigestible, and might militate against the health of a weakly person, so that it would be desirable to have the least possible quantity present. In fact, I would be strongly in favour of an emulsion that did not contain any gum, and I think it is quite possible to get this by working up the emulsifying power of Irish moss, as brought under our notice by a paper given at an Evening Meeting of the North British Branch last year by Mr. Peter Boa.

I think saccharin is destined to play an important part in the pharmacy of the future, but, in the meantime, there is a want of uniformity in commercial samples. One sample that came under my notice smelt strongly of oil of almonds, another had a distinct chlorine smell, and another was odourless. I was to have urged, to-night, the necessity for having a formula for an elixir saccharin, the sweetening power of which would have a relation to the sweetening power of syrupus B.P. I have worked a good deal at the subject, and was prepared to suggest a formula, but in this, also, I have been forestalled, as the *Pharmaceutical Journal* of November 19 contained a formula given by Mr. Martindale.

It is desirable, however, that the formula should be an authority sufficient to make it universal, and the Formulary Committee has done quite the proper thing in publishing this recipe. In my experiments with saccharin I thought I had a great difficulty to contend with, inasmuch as I could not get it to be three hundred times sweeter than sugar.

On mentioning this fact I was advised to estimate the sweetening power of the samples I had on hand, and after careful testing I fixed the relative sweetening power of saccharin to sugar as 1 = 100. Mr. C. B. Allen, in a letter to the *Pharmaceutical Journal* last week, quotes

its power as 1 = 129, but this, I think, is too high. In my estimation I find that I am corroborated by the editor of the *American Druggist* (Nov., p. 203), who, after a series of experiments states that he finds the sweetening power of saccharin to be 1 = 100.

With these remarks I will now close this paper. The suggestions I have made may appear trivial in themselves, but they fulfil their purpose if they assist to keep up the agitation to get the evident blemishes of our Pharmacopœia removed.

There is the broad principle of the difference between right and wrong to support the agitation, and I am sure you will all agree that it is eminently desirable to have the formulæ in a book which is taken as a legal standard as perfect as possible. Practical pharmacy should command our best attention. We should continually keep before us the dignity of our position as pharmacists, and it should be our endeavour to make ourselves worthy of our calling by conducting that inquiry and research which tends to the perfecting of processes.

There is a wide gulf between the position of the legitimate pharmacist and the unqualified keeper of a drug store. The legitimate pharmacist has the interests of his profession at heart; but I sigh for the future of pharmacy if its interests are to be consigned to the tender mercy of the store adventurer.

An interesting discussion followed, which was taken part in by Messrs. Coull, Duncan, Henry, Hill, King, Lunan, McEwan, Melvin, and Taylor, and on the motion of the Chairman a unanimous vote of thanks was awarded to Mr. Mackenzie.

Some queries were then read by the Secretary and partially discussed, further consideration of them being postponed to a future meeting.

The Chairman having intimated that the next meeting, to be held on December 7, would be devoted to "Notes and Queries," arranged by Mr. George Coull, Vice-President, the meeting was closed.

EDINBURGH UNIVERSITY CHEMICAL SOCIETY.

The opening lecture of the present session was delivered by the President of the Society, Professor A Crum Brown, on Wednesday evening, the 23rd Nov., the subject of the address being:—

Cryohydrates and Eutectic Alloys.

The lecturer at the outset paid a tribute to the memory of the late Professor Guthrie, to whose investigations we owe most of our knowledge of the subject under discussion. A cryohydrate, which word means literally a hydrate forming in the cold, was defined as the particular combination of water and another substance which has the lowest freezing point. Similarly a eutectic alloy is that combination of two or more metals which has the lowest melting point. The word "eutectic" simply means "well-melting" or "easily-melting." Strictly speaking, the case of the eutectic alloy includes that of the cryohydrate. The well known freezing mixture of snow and salt was taken as an example of the formation of a cryohydrate; the mixture having a lower freezing-point than its constituents becomes liquid, the heat required for liquefaction at the same time becoming latent and so causing great reduction of temperature. In this connection the work of J. M. Buchanan (chemist to the "Challenger Expedition") was referred to. When salt water freezes, the ice contains saline matter in its interstices and pores, and it was never quite ascertained that the mass was not a compound of ice and salt, until Mr. Buchanan found that it has the same melting-point as pure ice. If the frozen mass had been a compound of water and salt the melting point would of necessity have differed from that of pure ice. The experimental difficulties of the inquiry were considerable, but were successfully overcome by Mr. Buchanan. The "fusible metal," consisting of bismuth, lead, tin, and cadmium in certain proportions, was instanced as a eutectic alloy. Each of the component metals has a comparatively high melting point, yet the alloy melts at a temperature under 70° C. An instructive example of a eutectic alloy is observed in the process for the desilverization of lead. On cooling the molten metal the lead freezes, and ultimately leaves an alloy of lead and silver which has a lower melting point than either of its constituents. The comparatively small proportion of lead is then removed by cupellation, leaving pure silver. It was also pointed out that in the carbon compounds we have analogous instances of "eutectic alloys," such as what used to be known as margarine, which has a lower melting point than the stearin or palmitin of which it is composed.

In supporting a vote of thanks to the lecturer Dr. J. Gibson remarked that in endeavouring to prepare pure peroxide of hydrogen by freezing out the water he found that a point was reached when the frozen mass contained a large proportion of hydrogen peroxide, the substance obtained being undoubtedly a cryohydrate. It was therefore impossible to obtain anything like pure peroxide of hydrogen by that means.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held at 103, Great Russell Street, W.C., on Thursday, November 24. Mr. T. S. Dymond, President, in the chair.

After the reading and confirmation of the minutes of the last meeting the Hon. Secretary read a letter received from Mr. W. Baxter, jun., calling the attention of the Association to the Selborne Society. The object of this Society is to preserve birds, wild flowers, etc., from unnecessary destruction, and the co-operation and sympathy of the members was requested.

The following papers were then read:—

Note on a New Variety of Catechu.

BY T. S. DYMOND.

A variety of pale catechu in square plates has recently sometimes been imported into this country. Each piece is about 54 mm. square and 3 mm. thick. It presents the appearance of having been cut into these plates while still very moist. The colour is rich brown outside and a very pale cinnamon within. The taste is very bitter and astringent and sweet afterwards. It is derived from malacca, and is chiefly used by the Malays for mixing with betel nut for mastication. This variety was not included in the exhibit of gambier at the Edinburgh Forestry Exhibition, described by P. McEwan in the *Pharmaceutical Journal*, (iii.), xv., 793.

In order to determine its value, the following comparative experiment was made. Twenty grams of the plates and 20 grams of a good specimen of Rhio cube catechu were powdered and separately triturated with 50 c.c. of cold water. The mixtures were each thrown on a filter and washed with cold water till the astringent and colouring matter had been removed. The filtrates and washings were estimated for catechu-tannic acid by Löwenthal's process. The filters were then warmed, and boiling water passed over the contents till nothing more was dissolved from the residue. The filtrates were evaporated to a low bulk over a water-bath, dried over sulphuric acid, and weighed as catechin. The residue on the filter was dried on a water-bath and weighed.

I. *Cubes.*—During trituration much frothing occurred, and the mixture had a strong woody odour. The colouring matter was very difficult to completely remove, and when 250 c.c. of cold water had been passed through the filter the filtrate was still faintly coloured. The cold

water solution was a very deep brown colour, and bitter and astringent in taste.

Catechu taken	=20 grams.
Catechu-tannic acid	= 4·98 grams.
Catechin	= 9·78 grams.
Insoluble residue	= ·78 gram.

II. *Plates.*—No frothing occurred during trituration, and the mixture had little smell. The colouring matter was removed by washing with 100 c.c. of cold water. The colour of the cold water solution was brown, and when it had been made up to the same bulk as that from the cubes the intensity of the colour was found to be just half. The taste of this solution was intensely bitter and astringent, far more so than that from the cubes.

Catechu taken	=20 grams.
Catechu-tannic acid	= 6·94 grams.
Catechin	= 6·53 grams.
Insoluble residue	= 1·54 grams.

It will thus be seen that though the insoluble residue is greater and the catechin less than in the Rhio catechu, this tabular variety contains more of the active catechutannic acid, and has, therefore, greater medicinal activity. It has probably been specially prepared to satisfy the native demand for a strongly astringent article. The method adopted for cutting into these slices aids rapid desiccation, and so arrests fermentative decomposition. To this is probably due the less intense colour of the aqueous solution, and the absence of the odour that was noticed during the trituration of the Rhio variety with water.

My thanks are due to Mr. E. M. Holmes for providing me with a specimen of the tabular catechu and with information regarding its source. This investigation has been conducted in the laboratory of Professor Dunstan.

The Unofficial Formulary of the British Pharmaceutical Conference.

BY F. MCDIARMID.

Nothwithstanding the antipathy displayed in certain quarters to "extra" and unauthorized pharmacopœias published by any person or association outside the Medical Council, the report of the Committee of the British Pharmaceutical Conference, introducing these formulæ, gives ample reasons to medical men for prescribing, and to pharmacists for using them. I have, in the course of business, been called upon to prepare the majority of them, and the present note contains comments, suggestions or difficulties concerning them.

Three of the forms are more for the dispenser than for the laboratory assistant; I refer to the inj. curare hypoderm., pil. ferri Blaud, and emuls. ol. morrhuæ. The latter has received its quietus at the hands of Messrs. Gerrard and Conroy, and I may add my testimony to its inelegance. It is taken from the 'Physicians' Pharmacopœia,' whose author says "it will keep good for years." Not having, myself, prepared Blaud's pills from the formula given, I cannot speak as to its excellence or otherwise; dispensers of my acquaintance condemn, though it is but fair to say that it is recommended by many pharmacists.

Now, taking the preparations in alphabetical order, let us rapidly survey them.

Chloral c. Camphorâ.—Everyone is acquainted with this pigment for neuralgia, etc.; similar action takes place between menthol and chloral, and thymol and chloral.

Elixir Cascaræ.—To a limited extent the bitter taste of the cascara is palliated; but why is the dose decreased? In the B.P. the dose of liq. ext. is ½ to 2 drachms; the dose of the elixir is the same, though it only contains ⅖ of its volume of liquid extract.

Elixir Guaranæ.—The magnesia is used to set free the alkaloid, guaranine, from its natural combination. After some time the elixir sends down a copious deposit; it would be interesting to know whether this is due to differences of temperature in the preparation, and in the keeping.

Elixir Simplex.—This, a good preparation, is the elixir aurantii of the U.S.P. improved upon in process, but spoilt in flavour, according to those who dislike cinnamon.

Ext. Grindeliæ Liq.—This is made after the fashion of the fluid extracts of the U.S.P., though in this the menstruum is more alcoholic. The reverse is the case in ext. hydrastis liq. and ext. hamamelidis liq., where the menstruum is more aqueous than that of the U.S.P. (It is worth while remembering that the U.S.P. alcohol contains 94 per cent. of real alcohol, while our s.v.r. contains 84 per cent.). These extracts all deposit on keeping. Should they be filtered?

Lin. Opii Ammoniatum.—An imitation of Bow's liniment. The directions imply filtration at the time of mixing; this should be delayed rather, as the liniment continues to deposit.

Liq. Ferri Hypophosph. Co.—On the lines of Churchill's liquor. The statement as to strength, the mysterious qualifying particle "about" applies more to Churchill's preparation than to this, for this contains exactly 2 grains each of calcium and sodium hypophosphites, and 1 grain of magnesium hypophosphite to the fluid drachm, if made properly, though it will contain about 1½ grains of ferrous hypophosphite according as more or less iron is lost by washing and oxidation. Why not make the ferrous hypophosphite by double decomposition, as in the form for syr. ferri hypophosph.? One reason probably is that here no calcium sulphate is present, though many samples of acid. hypophos. are said to contain calcium. A good preparation.

Liq. Picis Carbonis.—Will it be true to call this an "imitation" of a certain well-known proprietary article, bearing a Government stamp? It yields a good permanent emulsion with water, but this is somewhat darker in colour than an emulsion made with liq. carbon. deterg. Query, How to keep this at a temperature of 120° F. for two days?

Syr. Apomorphin. Hydrochlor.—Used as an expectorant. Aqueous solutions of this salt become greenish on keeping, so the acid is added to prevent this change.

Syr. Butyl Chloral.—Used in neuralgia. From the 'Extra Pharmacopœia.'

Syr. Calc. Mangan. and Potass. Hypophosphit.—Used in syr. hypophosph. co. It is unnecessary to use hot water and mortar, as the calcium salt is not soluble in that quantity. Squire says it is not more soluble in hot water than in cold, while American authorities say it is soluble in 6·8 parts of cold and 6 parts of boiling water.

Syr. Cascaræ.—The liquorice disguises to a certain extent the nauseous cascara flavour; here, again, in order to get a full dose of cascara one must take 10 drachms of the syrup.

Syr. Ferri Hypophosph.—This has the annoying habit of depositing (to be Irish for the nonce) at the top as well as at the bottom, so that a syphon must be used to obtain it clear; filtration causes too much exposure to the risk of oxidation.

Syr. Ferri Phosph. Co.—Copied with two slight alterations from the 'Extra Pharmacopœia,' the use of metallic iron is an improvement on the old and tedious operation of precipitating ferrous phosphate; the addition of ½ oz. of orange flower water would render the syrup more pleasant. On keeping, a finely-divided precipitate separates.

Syr. Ferri Quin. and Strychn. Phosph.—This is weaker in quinine than the original formula for Easton's syrup; it remains almost colourless, but after a month's keeping in a cool place (say 50° and under) there is a separation of crystals of quinine phosphate; after two months it is almost solid.

Syr. Hypophosh. Co.—This differs from the American preparation in containing calcic and potassic salts; it also contains more quinine and less strychnine.

Tinct. Bryoniæ.—The directions here seem at first sight rather complicated; it is prepared according to the process of the Homœopathic Pharmacopœia. The moisture of the root does not seem to mix with the s.v.r. to any extent, as after maceration and expression a considerable quantity of s.v.t. had to be added to make the tinct. of the right strength. The dried root is more frequently used for tincture.

Tinct. Ergot. Ammon.—It has been found that ammonia, not only pharmaceutically, but also for therapeutic advantages, is the best solvent for ergot; the marc should be pressed to obtain the last of the menstruum.

Tinct. Iodi Decolorat.—This is often, if not generally, made with sodium hyposulphite as the decolorizing agent; this form, in my experience, does not produce a colourless tincture. I first made some according to the form; this did not become colourless after a fortnight, so, seeing Conroy's note on the subject, I added the rest of the s.v.r.; it is not yet colourless, though it has been exposed to warmth and light for six weeks. If all the s.v.r. is added at the first, the decolorizing process goes on rapidly, but the tincture does not become quite colourless, though there is no indication of free iodine. Should it be like water?

Tinct. Quillaiæ.—A paper by Mr. P. Boa in last week's Journal raises the question whether the menstruum is not too alcoholic. Saponin, the active principle, is said to be almost insoluble in alcohol, but very soluble in water. The tincture, however, serves its purpose well, viz., the suspending of coal-tar in water.

On the whole, the processes are satisfactory, and the products good, having been thoroughly worked out by practical men before being suggested for general use; and they are, in that respect, superior to several preparations which have the prefix "By Authority."

Note on the B.P. Process for the Estimation of Morphine in Opium.

BY F. C. J. BIRD.

In the B.P. process for the estimation of morphine in opium a certain method of proceeding is officially indicated; but as the result of considerable experience in working this process, I think that one or two of the official details may be advantageously modified.

The B.P. directs that the mixture of opium, lime and water be filtered "into a wide-mouthed bottle or stoppered flask (having a capacity of about 6 fl. oz., and marked at exactly 1040 grain-measures) until the filtrate reaches this mark." From the stated size of the vessels it is evidently intended that they are to receive the alcohol and ether, therefore in the case of either flask or bottle the graduation occurs at the worst possible place, viz.—at about the widest part. In a 6 oz. bottle so graduated I find that it is possible to measure apparently 1040 grain-measures which may vary to the extent of 15 grain-measures above or below that quantity; and in a flask the error would probably be greater. Taking the variation from the exact volume at 15 grain-measures, the possibility exists of the result being inaccurate to the extent of ·14 per cent., or about $\frac{1}{70}$ part of the amount of morphine actually obtained.

When working the official process I usually filter into a burette graduated to deliver exactly 1040 grain-measures and furnished with a tap, or a pinchcock fitting closely against the orifice, and this I consider to be a more accurate mode of procedure than that recommended in the B.P. (A small flask graduated at the neck to 1040 gr. m., would of course do equally as well as a burette.) The filtrate is then run into a tall, cylindrical, 6 oz. specimen jar, this being in my experience the most suitable vessel for the succeeding operation, as its straight sides admit of adherent crystals of morphine being easily washed out, and its narrow diameter favours the complete separation of the ethereal layer.

A convenient and simple instrument for decanting the latter consists of a straight pipette made of a 10-inch length of glass tube drawn to a point at one end, and attached at the other extremity to a yard of indiarubber tubing, in order to prevent the operator from inhaling vapour of ether.

When the decantation is nearly complete, some of the aqueous liquid is drawn up with the last drops of ether; the contents of the pipette at once separates into two portions, the lower of which is allowed to run back into the vessel, and the upper one transferred to the filter, the flow being regulated by pinching the indiarubber tube.

The error referred to above is not very great, and perhaps not more than that due to the 40 grain-measures allowed as average for extractive matter; but, still, I think that the consideration of any little detail conducive to accuracy tends in the direction of ultimate perfection.

Note on Liquid Extract of Cascara Sagrada.

BY W. RALPH DODD, F.C.S.

The source of *Cascara Sagrada* is *Rhamnus Purshiana*, which grows in temperate climates and abundantly in California, from whence it is largely imported. It appears to be identical with chittem bark, under which name it was used by the Indians and trappers of California as a cathartic, and it has been largely used in America, where it has been highly appreciated as a remedy for constipation and dyspepsia.

More recently it has been introduced into this country, and no drug with which I am acquainted has made such rapid progress in so short a time, and with every prospect of maintaining the reputation it has gained as a laxative. It is true it has fallen on receptive ground, since the species *Frangula* of the same genus has long been known and successfully used. It seems, however, to be displaced by its rival, at all events for a time. *Rhamnus Frangula* has many points in its favour; it is devoid of that unpleasant aloetic bitterness, milder in its action, and, moreover, there is a greater chance of it being more uniform in quality, because it is collected in Germany at such times as the bark is easily peeled and at the best season of the year for drying. The bark of the branches only is collected, on account of the wood being used for gunpowder making; hence the bark is really a secondary product. The supply is therefore certain of good quality and reasonable in price; it only now remains to ascertain the menstruum which will dissolve out the active principles in their natural associations, and the menstruum that will disturb the natural relations least will be the best.

It is not my intention to deal with *Rhamnus Frangula* to-night, but merely to bring forward the result of experiments begun a year or two ago and left half finished, owing to pressure of business.

I alluded to the rapid popularity of *Cascara Sagrada*, the truth of which is shown by it having taken up its position in the British Pharmacopœia of 1885, and strange to say a description appears under the title of *Rhamni Purshiani Cortex* (Synonym, *Cascara Sagrada*), and its preparations appear under the respective titles of *Extractum Cascaræ Sagradæ* and *Extractum Cascaræ Liquidum*, with the generic and specific name as a synonym. The anomaly does not end here, but the authorities seem to be divided in opinion as to what menstruum was best adapted to exhaust it of its active principles; for in the preparation of the extract they direct it to be prepared by macerating the powdered bark with a given quantity of proof spirit, then transferring to a percolator, and continuing the percolation with water until it is exhausted, and finally evaporating to a suitable consistence. Making the liquid extract they direct to boil the bark in coarse powder (whatever that may mean) with successive portions of water until exhausted, and evaporate down to a given bulk; add the quantity of spirit and filter. Both

methods cannot be correct; if one is right the other must be wrong. To say the least, the procedure is unscientific and unworthy of the position they occupy in the Pharmacopœia of 1885.

In the *Pharmaceutical Journal*, third series, vol. xvi., page 468, in Professor Attfield's reply to the critics of the Pharmacopœia appears the following:—

"Why exhaust the former with dilute spirit and the latter with water? ask Conroy, Bird; and Martindale echoes the inquiry. The usual precedents have been followed, and with care and skill the products are satisfactory, but original investigation is needed here. Experience will guide which of the two modes of working is the better."

What he says is quite correct; care and skill are required in making satisfactory products, and my experience is, in all cases the combined qualities are always requisite when working with the best apparatus, best materials, and the best menstruum, but more than that is wanted to produce a satisfactory liquid extract, as directed by the Pharmacopœia. The fact of having to evaporate so large a volume of water, and exposure to the atmosphere, the heat and oxidation, tend to disturb the natural condition, and form new relations, new combinations, and change of solubilities, so that the preparation is not what it ought to be, but is something else. Certain it is that the large quantity of water used takes up some inert matter, which forms an unsightly mass when the spirit is added.

I have, I think, said enough against the methods; critics are all ready made you know, and I shall now, therefore, confine myself to place on record a menstruum which in my hands has produced a satisfactory liquid extract in small and large quantities, 1 minim representing 1 grain of the bark, mixes well with water, wine or syrup.

Before detailing the process I beg to call your attention to the comparative solubility of the drug in various solvents. The menstruum representing 100.

No. 1. Menstruum	100
No. 2. Menstruum	75·89
Diluted spirit (spt. ten.)	75·32
Rectified spirit	25
Distilled water	75·10

I have already read an extract from Dr. Squibb's 'Ephemeris;' it is he who has done so much work, and thorough work too, in regard to percolation in ammonia; the menstruum which he finds the best, and which has been in successful use for eight years or more, is the following:—Alcohol, 25 parts; glycerine, 5 parts; water, 75 parts.

The menstruum No. 1, which appears at the head of the table, consists of—

Rectified spirit	45
Glycerine	5
Distilled water	50
No. 2. Rectified spirit	20
Glycerine	5
Distilled water	75

I regret to say I have not tried Dr. Squibb's formula, since the foregoing experiments were made long before I was in possession of the work. Judging from the amount of alcohol it contains, I should say it would be much better than the menstruum No. 2, but not so good as No. 1. although the alcohol used in the States is stronger than our spt. rect. in the ratio of 9 to 8. I will not detain you by drawing the comparison of the others, the percentages speak for themselves.

After testing the behaviour of this bark with various menstrua and in powder of various degrees of fineness, I find a powder passing through number twenty sieve to be quite fine enough for all practical purposes, and the menstruum No. 1. The process preferred is that of repercolation upon the same plan as set forth in a former paper, read at this Association on March 24, 1886, and published in the "Proceedings."

The formula—

Cascara Sagrada.	No. 20 powder 1 lb. 4 ozs.
Spt. rect.	℥ 45.
Ag. dest.	ad ℥ 100.
Glycerin	℥ v.

Moisten the powder with 16 fluid ounces of the menstruum, set aside in a covered vessel for twenty-four hours, then pass through No. 17 sieve and pack firmly in a percolator, add the remainder of the menstruum, and allow about an ounce to trickle through; close the exit tube and allow it to macerate four days, then continue the percolation at the rate of not more than five drops per minute, until a pint has been collected; set this aside as finished product, continue the percolation, and collect 16 fluid ounces at a time, using the first for moistening a fresh 20 ozs. of bark, from which collect a fresh pint; set aside as finished, and continue the process until the desired quantity of bark has been operated upon. Finally mix the products and reserve the weak percolate until such times as the operation is again continued.

The same menstruum may be used for making the extract, substituting water for glycerine.

In the course of the paper Mr. Dodd read some extracts from the last number of Dr. Squibb's 'Ephemeris' bearing on the subject.

The Influence of Saccharin upon the Action of some Ferments.

BY E. J. MILLARD.

As various vague and conflicting statements have been made as to the anti-fermentive character of saccharin, it was thought worthy of interest to ascertain its influence upon the more common ferments, such as pepsin, pancreatin, diastase and papain.

In all experiments a saturated aqueous solution of saccharin, containing about 0·2 per cent., was employed.

Pepsin.—The usual B.P. test proportions were taken, one experiment having the saturated solution of saccharin instead of distilled water. Maintained at 54° C. for twenty minutes, little or no difference was observable between them, in each case the albumin having been nearly dissolved. To ascertain the exact relationship, they were both at this stage filtered on tared filters, dried and weighed.

The albumin with saccharin solution weighed 16 grains, whilst the normal weighed 13 grains. It is evident, therefore, that saccharin has very little retarding influence over pepsin.

Pancreatin.—The effect of saccharin was tried both with pancreatin upon casein, and also upon starch.

In the former no hindrance was effected by saccharin, and even in large proportions it failed to appreciably affect the value and activity of the proteolytic ferment.

On starch, however, saccharin was found to interfere very materially with the amylolytic property of the ferment, and ten times the amount of ferment was required; but it was also found that if sodic bicarbonate were present in sufficient amount to neutralize the saccharin, no appreciable retardation took place.

Diastase.—Again saccharin showed a distinct retarding action, more than double the quantity of diastasic ferment being required to effect the same amount of conversion of starch as the ferment without saccharin performed. At a meeting of the Manchester Medical Society Dr. Dreschfeld stated that saccharin increases the diastasic power of malt. This is only true if the saccharin is first neutralized with alkali, the increase then, however, is very slight.

Papain.—Saccharin failed to affect to any marked extent the action of a sample of papain upon moist fibrin. The two experiments, the one with, and the other without saccharin, were stopped before complete conversion had taken place, and the undissolved portion filtered,

dried and weighed, showed a difference of only a few grains against the saccharin experiment.

In view of the increasing uses of saccharin it is important to note that its antifermentive influence is to a great extent neutralized by the use of alkali, especially when it is employed with the amylolytic ferments; but it hardly seems so essential with the proteolytic ferments.

Professor Salkowsky* reports that the antiseptic property of saccharin is greatly diminished when neutralized; in that case it appears that saccharin, like benzoic and salicylic acids, is deprived in a marked degree of its power of affecting the ferments when it loses both its acid nature and antisepticity.

Hints to Pharmacists on the Relief of Toothache.

BY W. RUSHTON.

Having been requested by the President to write a short paper, I thought that a few brief hints on affording temporary relief from toothache, would have a practical bearing in your everyday work, for I am sure none of us who have been employed in an ordinary retail pharmacy have remained long at our post without some poor victim of odontalgia coming in and requesting to be given "something" for toothache. To give a few hints as to what that something should be is the object of this short paper.

There are four main causes of toothache: (1) irritation of the tooth pulp; (2) exposure of the tooth pulp; (3) periostitis; (4) alveolar abscess, or gumboil.

The first, irritation of the tooth pulp, is caused as a rule by caries, which starts at some congenital malformation and is aided by the various acids engendered in the mouth, the result of disease or of fermentation of particles of food lodged in or between the teeth. The progress of the decay is no doubt also accelerated by various micrococci and cryptogamous growths. The decay creeps on till at last impressions of heat and cold or biting on a hard substance irritate the tooth pulp and cause pain of a more or less severe kind and duration.

In this species of toothache, the diagnosis could be arrived at by the following tests: no pain on tapping the crown of the tooth, no redness round edge of the gum, and the pain being only occasional and of a sharp character. Temporary relief would be afforded by a stopping, such as cotton wool saturated with a solution of mastich, or a plug of guttapercha to keep away cold and pressure, with advice to have a permanent filling put in.

The second variety more frequently seen by pharmacists is exposure of the pulp. The decay has proceeded till it has laid bare the pulp cavity, and any hot or cold substance or contact with any solid matter brings on an attack of severe toothache.

This form of toothache can be diagnosed by the severity and continuity of the pain of a sharp lancinating description, and little or no increase of pain on percussion; it is generally accompanied by extensive decay, and the gum may have a red ring round the margin.

Relief in this case may be obtained by introducing gently a plug of cotton wool saturated with camphorated spirit, camphorated chloroform, solution of cocaine, or any anodyne of that description; but of course these are only of a palliative description, and for permanent relief the pulp must either be destroyed or rendered healthy and a suitable filling introduced.

The third variety, periostitis or periodontitis, may occur separately or in conjunction with the two previous varieties, especially the latter. It is characterized by deep redness of the gums, the tooth being a little longer than its fellows, dull heavy pain, very much increased on percussion, and the tooth is loose and may easily be moved.

In simple periostitis the remedy *par excellence* is "lin. iodi, tr. aconiti (Fleming), partes æquales." Dry the gum with a napkin, paint the affected part, and keep the mouth open till a metallic film of iodine appears, which takes place in a few seconds. If the periostitis is complicated with pulp trouble as well this should be attended to as before.

In the last form of toothache, alveolar or gumboil abscess, the tooth pulp is always dead, and it is this dead and fetid mass that causes irritation of the tissues surrounding the apex of the tooth fang and formation of pus, which gradually increases and forces its way to the point of exit, generally the gum, though it often breaks in the cheek through injudicious external poulticing.

Among the poor as a rule the most practical plan is the extraction of the tooth, but if the patient can afford the necessary time, the tooth, as a rule, can be saved and rendered useful once more. Temporary and perhaps permanent relief (though not of a healthy kind) may be obtained by repeated poulticing inside the mouth (never outside) with a hot strong decoction of poppy heads and chamomile flowers, but as a rule it is kinder to your patient to send the sufferer to your dental brother.

* *Chem. Zeitung*, December 6, 1886.

Dispensing Memoranda.

BY F. V. BUTTERFIELD.

The title of this paper is rather comprehensive, but to-night being a new departure, devoted solely to *short* contributions, it is only intended to deal with one or two of the difficulties which are constantly cropping up in the experience of those whose daily work is dispensing.

With regard to its importance, dispensing may be considered the "soul" of the chemist's existence; take that away, and he at once degenerates, and descends to the level of the ordinary tradesman. This only serves to show how important it is that the pharmacist should cultivate the *scientific* portion of his business, and thus raise himself beyond the competition of ignorant hucksters and others, w ho seek to dabble in medicines. I trust the day is approaching when chemists, in general, will be looked upon as a body of public analysts, entrusted with the analyses of potable water, milk, wine, etc.; many of our leading pharmacists occupy this position at the present time.

It behoves us, then, to excel in this important branch of our business, known as the dispensing department, and make ourselves worthy of the confidence of the medical profession. But the question is, Are we doing this? If so, then why are physicians so frequently found to prescribe American pills and extracts and other proprietary pharmaceutical preparations, in preference to those of our own compounding, if ours are equal to them in elegance, and have the great advantage of being *freshly* and scientifically prepared. The "future of pharmacy" is engaging the attention of some of our leading men, and these proprietary preparations, multiplying as they are every day, must have a marked influence on it, certainly a bad one, in substituting *factory-made* mixtures, pills, etc., in place of pure and simple dispensing. Into what it will eventually evolutionize it is impossible to say, but the struggle must end in the "survival of the fittest."

Rule of thumb methods of manipulation, relics of the pharmacy of the past, are but too frequent in the dispensary of to-day, wasting valuable time and generally attended with unsatisfactory results. To take one example of a numerous class—a prescription to be dispensed reads thus:—

℞ Strychninæ . . . . . gr. j.
Excipientis . . q.s. ut fiant pilulæ sexaginta.

Now, this "excip. q.s." troubles the spirit of the man who pins his faith to "rule of thumb," whereas the efficient dispenser knows *by experiment* that it will require exactly equal parts of confection (rosæ caninæ) and pulv. glycyrrhizæ to make a mass of a proper pilular consistence, and weighing out 30 grains each to form a 1 grain pill, has finished his batch, whilst the former is still trying various excipients, and when done makes them larger or smaller than necessary, and probably too soft.

Ext. Cascar. Sag. has now become very popular, and owing to its disagreeable taste is frequently prescribed in form of pill, which is often very refractory, it being a difficult matter to prevent them "falling." Pills sent out as hard as they could possibly be made have been too frequently returned *en masse*.

Having had the same difficulty, a few experiments were accordingly tried, and the following method is one which I have used almost daily for a good length of time, and never known to fail.

After trying various excipients, with little success, the softening of the pills and consequent "falling," could only be attributed to absorption of moisture, so, in order to prevent this, a coating of varnish was tried, and proved the supposition to be correct.

In dispensing pills containing ext. cascar sag., varnishing (or coating with gelatine, etc.) is, therefore, considered a *sine quâ non*.

The commercial extract is usually very soft, when fresh, and, if kept free from damp and moisture, becomes harder on keeping, and much more difficult to manipulate. The best way is to at once evaporate it down by means of a water-bath, when it becomes very brittle and is readily reduced to powder, making up to original weight with some inert powder, as sugar of milk, and preserving in a stoppered bottle.

This is the form in which I always use it, and kept thus, it saves much valuable time in rapid dispensing.

To each pill is added ¼ grain each of pulv. tragac. and pulv. althææ, massing with spirit, just adding a few drops of syrup to keep it soft enough for rolling.

Some may think this a rather elaborate and lengthy process, but in practice, which is the chief consideration, it is simple, quick and reliable.

Fel Bovinum being also of a hygroscopic nature, can be successfully dispensed in the same manner.

Of course, in selecting a pill excipient there are several important points to be taken into consideration, such as not to increase the size of the pill more than can possibly be helped, not to impair its solubility, nor to have any chemical action on the various ingredients, etc.

Trimethylaminæ Hydrochlor. has been much prescribed in a pilular form just recently. This substance occurs in crystals which are extremely deliquescent, and in practice it is always better to allow them to completely liquefy in the mortar before attempting to make the mass. Out of several excipients tried, pulv. althææ and magnesia answered the best, the former helping to bind the mass and the latter absorbing the superfluous moisture. The strength usually ordered is 2 grains in each pill; this requires 1½ grain of each of the powders.

Among the scale preparations ferri et quininæ cit. and beberinæ sulph. are sometimes ordered in pill; syrup is the best excipient for the former, and glycerine for the latter.

Inf. Serpentariæ, prepared strictly according to the present Pharmacopœia, is incompatible with tr. iodi., with which it is sometimes prescribed. It is ordered to be made from the root in No. 20 powder, and thus a certain amount of starch is dissolved out, which of course in this case combines with the free iodine to form iodide of starch, giving a dark blue inky-looking mixture. This contrasts strongly with a similar mixture made with infusion prepared from the whole root, this remaining quite transparent, and containing free iodine, thus carrying out the intention of the prescriber, which it is the duty of every dispenser to do.

Specimens of the various pills mentioned in the paper, and the two infusions combined with iodine, were handed round for criticism and comparison.

Notes on Some B.P. Preparations.

BY A. WYBRANT.

Linimentum Ammoniæ.—I have always considered the B.P. product as an inelegant preparation, separating in time, often too thick, sometimes too thin, and certainly not a perfect emulsion.

Many suggestions have been made from time to time to overcome these difficulties, but so far as I am aware, the matter has not been satisfactorily solved.

In the *American Journal of Pharmacy*, October, 1882, Mr. S. S. Bradford recommends the substitution of cotton seed oil for olive oil.

One sample was made in this way, and on standing separated about one-fifth, and became much thicker.

In the *Pharmaceutical Journal*, 3rd series, xv., 282, Mr. Alcock says that if made with sesame oil a good pourable and stable emulsion results. Another sample was made as he suggests, with strictly B.P. strength of ammonia, but was found much too thick, although a permanent liniment.

Another, however, made with nut oil formed a white creamy liniment, which showed no separation, and only slight thickening after being made for months. The only thing necessary to succeed with this oil is that B.P. ammonia and accurate measurement be used.

Tinctura Opii.—Instead of following the B.P. directions of maceration for seven days with proof spirit, etc., the following is the *modus operandi* which I have adopted. The coarsely powdered opium was mixed with enough water to cover it, then heated to boiling point and allowed to cool. It was then macerated for three days in a closed vessel with water, occasionally shaking it; after this enough rectified spirit was added to make the mixed liquids of proof spirit strength, then macerated three days more, afterwards pressed and filtered through calico. The dried residual matter from 12 ounces of opium treated in this way weighed 4 ounces. Experiments with this showed it to be nearly inert. It had scarcely any odour of opium, and on further treatment with proof spirit yielded a very faintly coloured, nearly tasteless, tincture. Given in 60 grain doses to a dog, it had no apparent effect.

On maceration with rectified spirit I got a very sticky tincture, showing that much resinous matter remained undissolved.

The exhausted marc from 12 ounces of opium, by the B.P. process, when dried and powdered, weighed 4½ ounces.

Experiments with this showed it to be not thoroughly exhausted. A tincture made with proof spirit from it gave much colour and the characteristic taste of tincture of opium.

I have not had time as yet to ascertain absence or presence of morphine in these different after products, but judging from the results I have just stated, I have presumed to think that the process sketched must more thoroughly exhaust the opium than that of the B.P.

Lin. Terebinthinæ.—Since the publication of the B.P., 1885, this seems to have been a sort of pharmaceutical bone of contention. I have not brought the subject before you to-night with any idea of throwing any fresh light on it, but rather with the intention of proving, or trying to prove, that even after the lapse of two years, and in spite of the experiments and researches of our great pharmaceutical lights and the voluminous correspondence which ensued, we seem to be as much in the dark as ever, at least if variety of products may be taken as a guide.

All my efforts at producing the "fawn-coloured emulsion," as Squire calls it, have been failures. Some were gelatinous, several without any combination, many emulsified but not permanently.

Two samples were obtained from two wholesale houses, and at first glance you would not think them to be the same preparation.

That two first-class houses should send out under the same name products so widely different in appearance is to me a proof of how unreliable the B.P. process is.

Two specimens were obtained from two dispensing chemists, in response to a prescription ordering "lin.

terebinth., B.P., 1885." One sample was so thick that it was only by much coaxing I could get about an ounce from the two ounces sent.

I will not delay you longer by any digression on the want of unanimity thus presented, the subject is too depressing. What I wish to know is as follows: Is a formula that gives such varied results, results which even Professor Redwood himself could not always get alike, a good one? I think not. In the old formula, by the addition of a little rectified spirit, a bright, clear and elegant liniment could be made, always the same and always permanent.

Dispensing Iodide of Sodium.

BY W. G. BLACKHAM.

The fact that iodide of sodium is rapidly superseding its potassium equivalent on account of its less depressing after effects is, I think, sufficient excuse for this very short and incomplete note.

Some time ago I was struck by the varying physical characters of the salt. Some samples presenting a "dry white crystalline" appearance, others being "white and crystalline" but decidedly not "dry." On one occasion having to dispense some iodide of sodium with syrup of iodide of iron and water, I found from my resulting mixture that the former contained carbonate. Quite recently I investigated some six specimens of the salt obtained from different houses, but as I have not had time to thoroughly verify my results, I shall give them in round, but for the present object sufficiently accurate figures. One sample contained 5 per cent. and another 6 per cent. of carbonate of sodium, and I have reason to believe that there are samples in the market containing even a greater percentage of carbonate. These two lots were anhydrous, were not excessively deliquescent, nor so *very* readily soluble. The other four packages of iodide were decidedly hydrous in appearance and in reality. The water in the four samples varied from 7 per cent. to 10 per cent. One other specimen I examined contained as much as 12 per cent. of water, but although the crystals were detached yet it was evident that they had deliquesced somewhat. I may add that I have not been able to obtain an iodide of sodium corresponding to the B.P. requirements. The moral from these few remarks is that the dispenser must look to his sodium iodide. The salt contaminated with carbonate should of course never be dispensed, for as it is frequently prescribed together with iron the dispenser may have *un mauvais quart d'heure* with both patient and prescriber. The water in the hydrous iodide should be estimated and allowed for, as it is not satisfactory to know that 10 per cent. less of the salt may be exhibited than the prescriber intends. I hesitate to make an apology for this latter suggestion, on account of the difficulty of obtaining the correct salt.

The reasons for these varying characters are difficult to find. At first I was disposed to think that some unexpected decompositions took place in its preparation from the solution of soda and iodine, and subsequent roasting with charcoal, but that I do not now believe to be the case. Why so many of the salts should contain so much water I have also not been able to understand, as I have tried several of them, and on examination found no decomposition of any kind. In fact, it was always easy to dry the salts to the official requirements. With great reluctance I am forced to the conclusion that a direct admixture of carbonate takes place, and great negligence is displayed in sending the article out.

Note on Coca.

BY W. BAXTER, JUN.

On the occasion of a visit to North Wales this summer I repeated experiments upon the value of coca in staving off hunger and relieving that oppressive respiration felt during sharp mountain ascents. During the ascent of the Fach I chewed 90 grains of coca leaves, and this, as before, enabled me to carry out a hard day's climb with little fatigue; but after my first full meal I again experienced the severe headache which was so noticeable after every similar experiment last year. After reading various notices on cocaine by Dr. R. Stockman, Professor Bignon, of Lima, and others, I begin to wonder whether the amount of amorphous cocaine present in the leaves is the cause of this. I make this suggestion because it is certain that the amorphous alkaloid does produce headache and cramp in the stomach. Or, on the other hand, may it be due to the presence of the volatile alkaloid hygrine?

It may be of interest to record some experience with cocaine in sea-sickness. Chocolate-flavoured lozenges were invariably unsuccessful. But those made with simple sugar were in more than one case successful. The failure of the chocolate-flavoured ones seems to me to point to some irritating body like hygrine, for in several cases they not only failed to cure, but seemed to give rise to headache and slight ulceration of the throat. Of course from this it would appear as a matter of chance that the cocaine in the unflavoured lozenges were free from the presence of this irritating body.

Notes on Some Abnormal Flowers.

BY E. H. FARR.

Some two years since I had the honour of bringing before this Association and describing a number of specimens of plants showing marked deviation from the normal mode of development. With your kind permission I will now bring forward a few more recently gathered.

1. *Cardamine pratensis*, showing conversion of stamens into petals, and pistil replaced by complete flower bud.

This plant was gathered last May at Torquay, and with several others growing near, showed marked deviation from the normal type.

Within the calyx, in place of the four petals and six stamens usually found, we here find several whorls of petals or petaloid bodies formed in part by conversion of stamens into petals, but also in part by formation of an extra whorl of petals, as the number did not correspond with the sum of the petals and stamens of the normal plant. In the case of some of the inner ones the staminal nature was shown, as is frequently the case in similar forms, by the presence of an abortive anther lobe at the edge of the petal.

The next point of peculiarity is the absence of any pistil, its place being supplied by a stalked flower, the said flower itself being "double" in the same manner, the stamens being petaloid, and the pistil being abortive or very rudimentary in such specimens as were examined.

2. *Bellis perennis*, showing the centre of the head replaced by a secondary head of flowers.—This specimen was found near Uckfield in September last, and is an example of prolongation of the axis, which is rather rare in wild plants of this order, though in cultivated species it is not so uncommon.

The main involucre is normal, as are the strap-shaped florets of the ray, but the disk florets which should fill the centre of the head, are only represented by one or two rows of florets, the others being replaced by the secondary growth, which has all the appearance of a normal daisy bud.

3. *Arenaria trinervis*.—In this plant one of the sepals shows a peculiar development, one-half having followed the normal mode of growth, and possessing the characteristics of a sepal, whilst the other half has all the appearance of a normal leaf. The other sepals with the petals and stamens are normal.

A somewhat similar development in the case of *Lychnis diurna* was described and figured in a paper read before the School of Pharmacy Students' Association (*Pharm. Journ.*, March 14, 1885).

At the conclusion of the paper, the above-mentioned examples of vegetable teratology were handed round.

Dispensing Difficulties in Africa.

At the conclusion of the reading of the papers, Mr. Saul called attention to an interesting communication that had recently appeared in the foreign correspondence of the *Chemist and Druggist*. The writer gave a graphic description of the difficulties of dispensing in the south of Algeria, as experienced by pharmacist Aide-Major Lahache. The heat on the borders of the Sahara is so intense, that ammonia, collodion and tinctures are preserved only with great difficulty, sodium sulphate, lard, vaseline, cocoa-butter and ointments liquefy, and suppositories cannot be used. Mercurial ointment, the pharmacien added, separates into two layers, the upper being transparent and fluid and the lower still holding the metal in suspension. To illustrate this latter phenomenon, Mr. Saul exhibited a bottle containing some unguentum hydrargyri that had been returned after a couple of years sojourn at Suakin. The temperature of the Soudan had had exactly the effect upon the ointment described by our foreign *confrère*. Above was a sharply defined layer of white fat, and below this a dark emulsion of mercury and fat; even at the bottom, where it was most dense, there was no sign of any aggregation of the metal into globules.

Algin.

Mr. Joseph Ince exhibited a sample of algin or alginate of sodium received from Mr. E. C. C. Stanford, of the North British Chemical Company, Glasgow. It had been sent in consequence of the report of Mr. Gerrard's paper on "Emulsions," published in the *Pharmaceutical Journal*, and specially in relation to the discussion thereon. Mr. Stanford states that as far as he has tested it its emulsive power is considerable, which Mr. Ince said he could confirm. A 10 per cent. solution appears to be thicker than a 50 per cent. solution of gum acacia, for which scarce article it might prove a good substitute. It requires about twenty-four hours for solution in cold water, and is stated to have no gelatinizing power like gelose or gelatine; it more resembles albumin. It is incompatable with most metallic salts and acids, by which it is precipitated. The gum acacia of commerce being of late unsatisfactory, both in point of colour and keeping properties, Mr. Ince said that algin or any other substitute deserved attention.

A discussion ensued in which most of the authors took part, as did also Dr. Rathbun, and Mr. P. McEwan.

The meeting then terminated.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, November 24, Mr F. C. J. Bird, Vice-President, in the chair.

A paper was read on "The Estimation of Arsenic by means of Iodine," by Mr. E. J. Woolley. The paper will be printed in an early number of the Journal.

A discussion followed, in which the Chairman, Messrs. Short and Williams took part.

Mr. E. White then gave a Report on Botany and Materia Medica, consisting of brief notes on the following subjects:—

Strophanthus, its source, characters, active principle, etc.; convallarin and convallamarin, and their physiological action; ustilagine and its preparation; false chirettas; wurrus; Indian-grown jalap; the "discovery" of stenocarpine, and the researches of Paul and Cownley, confirmed by N, showing it to be non-existent; and Braithwaite's examination of mylabris bifasciata, etc.

This Report gave rise to a discussion, in which the Chairman, Secretary, and Messrs. Braithwaite and Millard joined.

Various miscellaneous subjects were also brought forward and discussed by Messrs. Bird, Lucas, Millard, Passmore, Short and White, after which the meeting adjourned.

At a meeting of the Executive Committee, held November 14, the following members were appointed as a Committee of Reporters on Science:—

Pharmacology, Mr. W. L. Williams; Practical Pharmacy, Mr. F. C. J. Bird; Botany and Materia Medica, Mr. E. White; Physics, Mr. F. W. Short; Organic Chemistry. Miss M. E. Buchanan; Inorganic Chemistry, Mr. L. W. Hawkins; Analytical Chemistry, Mr. W. Poole.

Obituary.

CHARLES LOUDON BLOXAM.

The death on the 28th of November is announced of Mr. Charles Loudon Bloxam, in his 56th year. The deceased was Professor of Chemistry in King's College, London, and also formerly held a similar appointment in connection with the Royal Military Academy, Woolwich. He was one of the earlier pupils in the Royal College of Chemistry and whilst officiating there as one of the assistants under Dr. Hofmann he produced in conjunction with Mr.—now Sir Frederick—Abel a 'Handbook of Chemistry,' that was well received, and formed the basis of Bloxam's 'Chemistry,' which has passed through five editions.

Notice has also been received of the death of the following:—

On the 17th of September, Mr. Poole Reynolds, Chemist and Druggist, Bassingham, Lincolnshire. Aged 77 years.

On the 22nd of November, Mr. Charles Smith Goodwyn, Chemist and Druggist, Wray Crescent, Tollington Park, London. Aged 49 years. Mr. Goodwyn had been a Member of the Pharmaceutical Society since 1870.

On the 26th of November, Mr. Joseph Bowes, Lowther Street, Whitehaven. Aged 55 years.

BOOK RECEIVED.

OLFACTICS AND THE PHYSICAL SENSES. By CHARLES HENRY PIESSE. London: Piesse and Lubin. 1887. From the Publishers.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

POISONOUS HONEY.

Sir,—In reference to poisonous honey the following extract from Moffat's 'Missionary Labours and Scenes in Southern Africa' (1846. London: John Snow, Paternoster Row), may be interesting, although the honey mentioned in it was simply irritant, and not at all narcotic. "One day our guide (for it was a country without roads) led us towards a ravine which presented an animating appearance, from the sides of the hills being covered with a lovely green; but, on our reaching them, scarcely anything was to be seen but a species of euphorbia, useless either to man or beast, and through which we with difficulty made our way. Being hot, and the oxen worn out, we halted; and some of the men having been successful in finding honey in the fissures of the rocks, we ate with no little relish, thinking ourselves fortunate, for food was scarce. Shortly after, an individual complained that his throat was becoming very hot; then a second and a third, till all who had eaten felt as if their throats were on fire.

A native coming up, and seing our hands and faces smeared with honey, with the greatest simplicity said, 'You had better not eat the honey of this vale; do you not see the poison bushes (euphorbia), from the flowers of which the bees extract the honey and the poison too?' Everyone had recourse to the little water that remained in the vessels, for the inward heat was terrible; and the water, instead of allaying, only increased the pain. No serious consequences followed; but it was several days before we got rid of a most unpleasant sensation in the head as well as in the throat."

10, *Stratford Place, W.* T. LAUDER BRUNTON.

PIL. RHEI CO.

Sir,—One would have thought that after the many and exhaustive criticisms we have had on the B.P., anything new would be almost impossible.

But there is one thing, perhaps slight in itself, which I do not remember having seen mentioned, yet I think worthy of attention.

If a medical man order pil. rhei co., what does he expect to have, and what should he have dispensed?

The general manner, I believe, in making extemporaneous pill masses, is to use specie (*i.e.*, of course, the active ingredients of the pill without the excipient), of which in this pil., according to the B.P. quantities, 2 parts would be equal to 3 of mass.

Therefore, if 5 grains of pil. rhei co. be ordered, we use two-thirds of 5 grains = $3\frac{1}{3}$ grains of active ingredients.

This can be taken as applying to the pil. alone, or combined with other ingredients.

Again, it may be said the medical man orders pil. rhei, *i.e.*, the mass—we dispense stock pills (made, of course, by ourselves, not the questionable elegant products of some foreign wholesale traders).

Now I think it is generally accepted that the quantity of excipient ordered by the B.P. in this mass is far too large; half that ordered being sufficient, therefore, in this case, our 5 grains contains four-fifths of 5 grains = 4 grains of active ingredients.

Therefore, the proportions of the B.P. being unworkable, the question arises, is it more correct to put a definite quantity of active ingredients into each pill, calculated from the B.P. proportions, or simply make up the mass with q.s. excipient, and from this weigh our 5 grains?

This will apply in a lesser degree to some other of the B.P. pills.

Also whether it would be preferable to give definite doses of active ingredients, instead of indefinite doses, as will be contained in the mass, is for others to decide.

ONE OF THE CRAFT.

AN INCOMPATIBLE MIXTURE.

Sir,—I have read with some interest the paragraph in last week's Journal, with reference to the fatality caused by a mixture of chlorate of potash and syrup of iodide of iron.

I myself dispensed a mixture the other day containing the same two ingredients, and in the same proportion, only rather more diluted.

The prescription was as follows:—

℞ Potass chlorate	80 gr.
Syr. Ferri iodide	℥j.
Sp. chlorof.	℥ij.
Tr. calumb.	℥ss.
Aquam ad.	℥viij.

M. one-eighth part ter. die. sd.

No perceptible change took place until some time after mixing, when there appeared a slight darkening in colour, and a decided smell and taste of free iodine. However, the patient has since had the mixture repeated, so I presume that no ill effect has resulted from it.

On mixing the two ingredients, without either the sp. chlorof. or tr. calumb., the change is more easily observed. The iodine appears to be slowly liberated, until after standing for twenty-four hours the liquid assumes a reddish-brown colour, but I do not find that the iodine is "deposited in abundance," and would suggest that the precipitate may have been ferric oxide. I ought perhaps to mention that the syr. ferri iodidi used was made, as it ought always to be made, according to the new process in the B.P.

Great Malvern. R. BARRAT.

PRACTICAL DISPENSING.

Sir,—In your last issue we were favoured with a paper on the above subject by Mr. Redhead. I can agree with the writer's remarks in the main, but I think I am only expressing the opinions of a large majority of chemists when I say that I think he takes too much upon himself when he lays down the law so emphatically. He said, "In the case of mixtures containing insoluble powders and no medium for suspension is ordered, mucilage must be used. Acacia mucilage may be used, but if much tincture or spirits are ordered, you will find it better to use tragacanth mucilage. Now what does Mr. Redhead mean by the above? He goes on to say that mag. carb. does not require mucilage. Does undissolved quin. sulph., rhubarb, bismuth. carb., etc., etc., require mucilage or does it not? Is it a question which is to be left to the discretion of each individual dispenser throughout the country to put mucilage into a mixture or leave it out as he thinks fit? Where does Mr. Redhead draw the line? The dispenser may also use either mucilage of acacia or of tragacanth, as he chooses. As this peculiar doctrine is so publicly put forth in the Journal, I think it is a matter of such serious importance as to call for comment and explanation. If we accept Mr. Redhead's doctrine we must leave as an open question for the dispenser whether to use mucilage of acacia or muc. tragac., and also whether he is to use any mucilage whatever. Mr. Redhead recommends that when tr. canab. ind. is ordered in a mixture it should be triturated with mucilage of tragacanth before adding the other ingredients. With all due deference to Mr. Redhead, I think that many pharmacists will disagree with his opinion on this point. I think that an equally good, if not a much better result would be obtained by taking a dry bottle (or better still, rinse the bottle with s.v.r.) and making the muc. tragac. in it, then adding the tr. cannab. ind. to the slightly diluted mucilage. The use of a mortar is thus obviated. In fact, I think that it is generally acknowledged that under ordinary circumstances it is unwise to use a mortar in mixtures containing pulv. tragacanth.

Manchester. W. A. THOMAS.

THE HOP BITTERS CO. AND THE TRADE.

Sir,—The Hop Bitters Co. are busy here and there issuing writs, threatening proceedings against chemists selling Hop Tonic, etc., in certain square bottles as supplied by Messrs. Maw and others.

The plan is, a clerical looking individual enters a shop he inquires for hop bitters, and when told the price asks, "Have you nothing cheaper?" and after putting some leading questions he purchases a bottle of the private preparation at the cheaper rate. He goes out, and in comes another with a good deal of legal air about his manner, and serves the chemist with a copy of what he calls a writ; and in a few days, when the effect of the service of the writ has had sufficient time to alarm the chemist, down comes a letter offering to stay proceedings if the chemist pays the costs and signs an apology of the most humiliating character. If there are any of your readers who have been served with writs, and are courageous enough to stand on their dignity and have not apologized, I shall be glad if they will communicate with me.

Sheerness. D. PROSSER.

R. Esam.—The different classes are regulated by Act of Parliament. An attempt to alter the present regulations in the direction advocated by you was made in the Draft Bill which the Council submitted to the Government some time since. Although this was unsuccessful there is no reason to assume that the Council has lost sight of the point.

T. W. Smith.—The only way to decide the question is to submit some of the substance to analysis.

W. Duplock.—The change would be due to decomposition of the iodide of iron in the mixture.

C. Atterbury.—The deposit consists of ova of the whelk.

J. F. Fletcher.—We think the insertion of the memorandum sent to the Secretary, might lead to misconstruction and inconvenience.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Brown, F. P. Smith, Powell, Martindale, Perry, Richardson and Co., Whitfield, Gravill, Apprentice, W. A. J., A. W. F.

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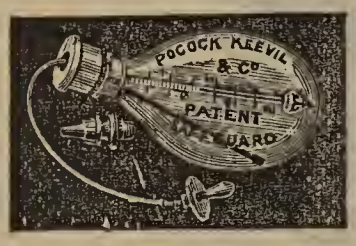

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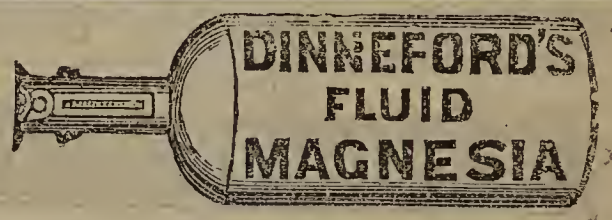

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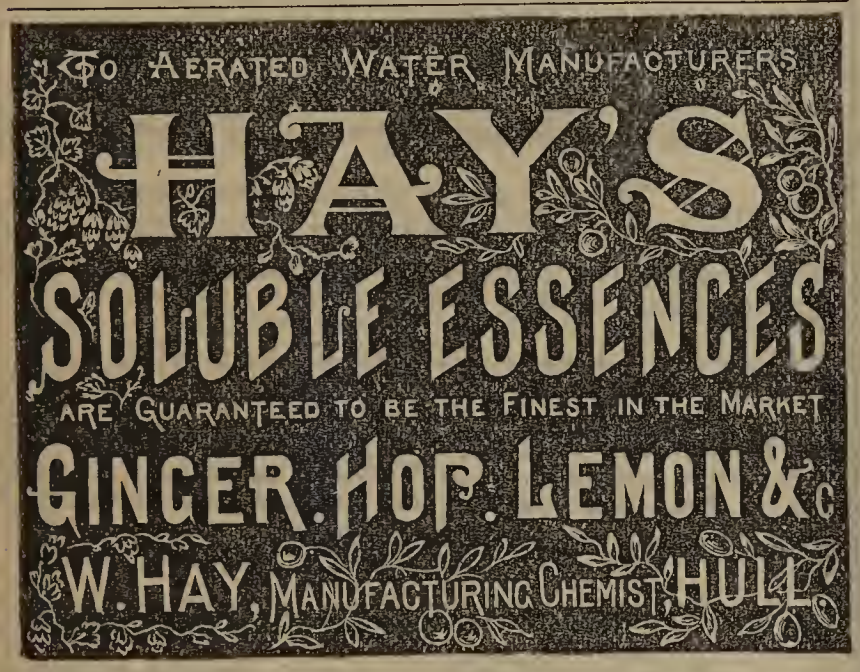

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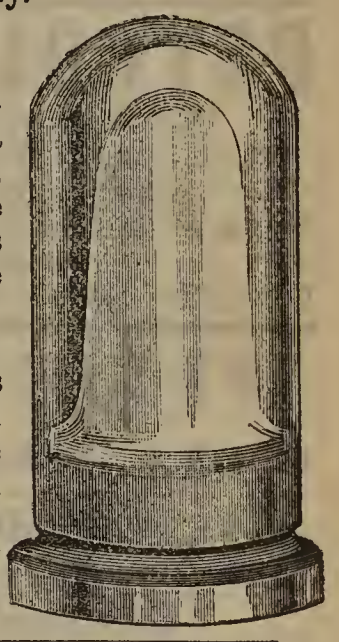

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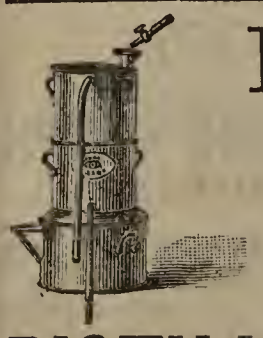

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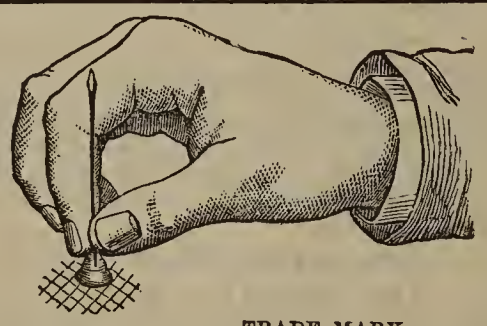

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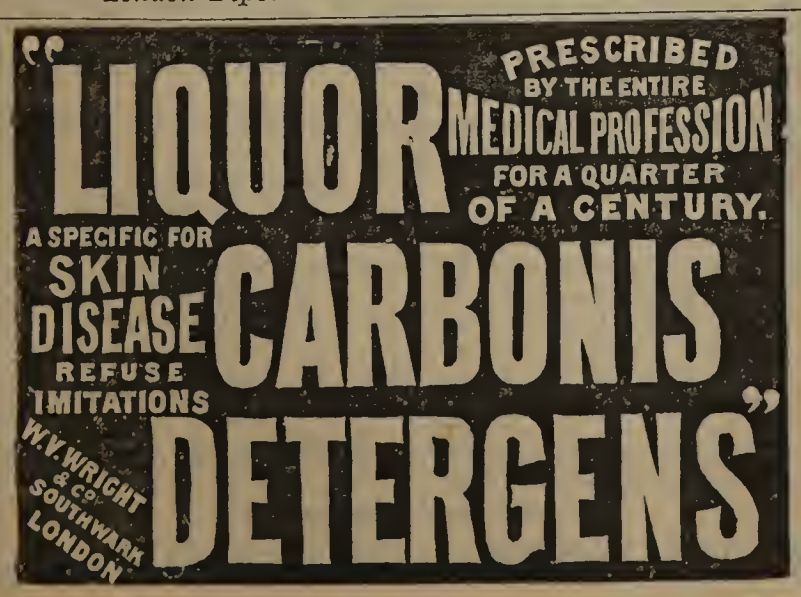

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 911.] SATURDAY, DECEMBER 10, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

The next EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, December 14th, at half-past Seven.

The chair will be taken at Eight *precisely*.

The following paper will be read :—

"The Alleged Fundamental Errors in the British Pharmacopœia."

By Emeritus Professor REDWOOD.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

EVENING MEETING.

36, YORK PLACE, EDINBURGH.

An EVENING MEETING of the Society will be held in the Society's House, 36, York Place, Edinburgh, on Friday next, December 16th, at 8.30.

Mr. JOHN NESBIT in the chair.

The following papers will be read :—

"Liquor Ferri Hypophosphitis Compositus, B.P.C."

By ADAM GIBSON, F.C.S.

"Emulsio Olei Morrhuæ, B.P.C."

"Tinctura Quillaiæ, B.P.C."

By PETER BOA.

"Tinctura Iodi Decolorata, B.P.C."

By J. RUTHERFORD HILL.

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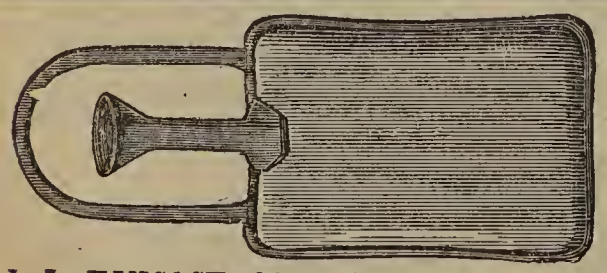

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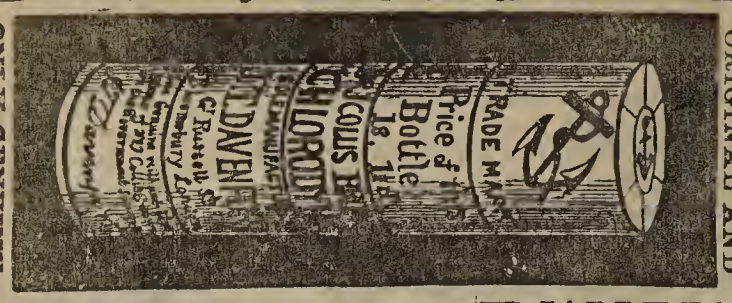

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DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

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From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

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IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

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From MR. W. H JOHNSON, Salford and Oldham.

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AMOMON AND CARDAMOMON.

BY W. DYMOCK.

The recent discovery of the botanical source of hamama (see *Pharm. Journ.*, Aug. 20, 1887) enables us, I think, better to understand the description by Dioscorides of the "amomon" of the Greeks. His chapter περὶ ἄμωμου has always puzzled commentators. It has an hiatus in the middle; there are several doubtful readings in the text, and a paragraph which appears to have got into it by mistake. In the edition of 1529 we read Φύλλα δέ βρυονια (*sic*) ὅμοια, and in the same edition, where bryony is treated of, the word is printed βρυωνία in the usual manner. I think this suggests that the true text may have been moss, and not bryony. We can then read the description of the first kind of amomon as follows:—"Amomon is a small shrubby plant (θαμνίσκος), like a bunch of intertwining woody stems. It has a small flower like the wall-flower (λευκοίον); the leaves are like moss leaves; the best is the Armenian, of a golden tinge, with reddish-yellow stems, sufficiently fragrant." This would agree very well with the characters of the genus *Dionysia*. Dioscorides then proceeds to describe the kind found in Media, differing somewhat from the first, and smelling like peganon. So far the Mahometan version is much the same as the Greek text, but it omits the next paragraph from τὸν δὲ πόντικον to ὑπέρυθρον, where the hiatus occurs, and begins the description of the third kind thus:—"A third kind is the Coptic, etc.," evidently quite a different drug from the first two. Throughout the remainder of the chapter the Greek and Mahometan versions agree, with the exception that the latter omits the mention of amomis. For the sake of comparison I give the two versions in parallel columns:—

DIOSCORIDES. *The Greek Text translated from Ed.* 1529.	DIOSCORIDES. *Mahometan Version (from the Tuhfat).*
Amomon is a small shrubby plant, like a bunch of intertwining woody stems. It has a small flower like the wall-flower; the leaves are like moss leaves. The best is the Armenian, of a golden tinge, with yellowish stems sufficiently fragrant.	Hamama is a shrubby plant with latticed, yellowish-red woody branches, growing in a bunch; it has a small reddish-yellow flower like a wall-flower and leaves like *Fáshara*; it is pungent and fragrant, and the seeds are pungent; it grows in Armenia and Tarsus—this is the best kind.
The Median kind grows in moist open places; it is less active and larger, greenish and soft to the touch, having fibrous stems; it smells like Peganon.	Another kind is the water kind, which is found in Syria; it is greenish and soft, and when rubbed in the hand has an odour-like rue.
The Pontic kind is yellowish, not large, easily broken, in bunches, full of seed, pungent. Choose what is fresh and of a reddish-white colour . . . . . is not intertwining, but loose and spreading, full of seed, in bunches, heavy, very sweet smelling, not mouldy, of a pungent taste and uniform colour.	*Wanting, but part of the sense appears to have been incorporated in the above description.*
	A third kind is the Coptic, it is not latticed, but straggling and full of seed, pungent and reddish-white; it is better than the last or water kind.

The conclusion of the chapter in Dioscorides is noteworthy. He says, "In the selection of these articles it is important to avoid broken pieces, and to choose such specimens as have entire branches springing from a single root." This is applicable to hamama but not to cardamoms.

Theophrastus (9, 7, 1) merely mentions cardamomon and amomon as coming from Media. Celsus (lib. v.) mentions amomum and cardamomum as ingredients in a "Malagma adjecur dolens." Pliny (13, 1) speaks of amomum as an Assyrian shrub with a white flower, from which a costly perfume was made. In short there is no medical description of the drug except by Dioscorides.

The non-medical classical writers mention amomum, but they allude to it in a vague way, or as a precious perfume.

In Virgil's third Eclogue Damætas says:—

"Qui te, Pollio, amat, veniat, quo te quoque gaudet:
Mella fluant illi, ferat et rubus asper amomum."

In the Eclogue on the birth of Marcellus (4, 24) we read:—

"Occidet et serpens, et fallax herba veneni
Occidet: Assyrium vulgo nascetur *amomum*."

Juvenal (4, 108) has:—

"Et matutino sudans Crispinus amomo,
Quantum vix redolent duo funera."

Persius (3, 104) says that the corpse of the votary of pleasure plastered over with amomum stretches out his rigid heels to the door.

Ovid in the same sense ('Pont. El.,' 10, 51) has,

"Ille tibi exsequias, et magni funus honoris
Fecit, et ingelidos fudit amoma sinus."

Among the Arabians Ibn Sina (Avicenna) only notices one kind of Hamámá, "Shajrat k'ankood min Khashab mushabbak" (the first kind of Dioscorides); but he remarks that it affords a sticky exudation. Sheik Dawood, of Antioch, who wrote in 1656, A.D., says: "Hamámá, in Greek amomiya, and its flowers are called lenkáin; it is not bruwániya, which is a name for fáshara (bryony); the plant consists of sticks latticed together in a bunch* of a reddish-golden colour, acrid, hot, perfumed; it springs from a single root, hard, perfumed; it grows in Armenia and Tarsus, and a kind of it in Syria is greenish and small, or yellowish and fragile; both spurious, and it grows in the month of Nisan (April); it has reddish flowers, like those of the wall-flower or sádaj, and leaves like fáshara, etc."

The Persian writers give similar descriptions, but that of Haji Zein el Attár (A.D. 1368) is more original. He says:—"Hamámá, amámún or amúman, in Persian mahilú, hot and dry in the second and some say in the third degree. It is of two kinds, one is well-known, and is called in Shiraz mahilú, and there is another kind like Parsiawashán, and like it, of a reddish-yellow colour; the leaves are green and small, and the flowers yellow and small, and the plant is about a span high, or in my experience less. It grows on stones. The best is of a golden colour from Armenia, and has a sweet smell."

Mr. E. M. Holmes has found in the Herbarium of the British Museum a specimen of *Dionysia diapensiæfolia*, Boiss, bearing an inscription in the handwriting of Kotschy, which states that the plant grows on stones as stated by Haji Zein. He has also ascertained that the Persian drug is aromatic, possibly Armenia may furnish a more perfumed plant belonging to the same genus. I see nothing

* In a Syrian manuscript of Sheik Dawood's work which I have, and which was written in A.D. 1631, the reading is: "The plant is rough, and latticed together in a bunch."

in the description of Dioscorides to connect amomon with cardamomon. On the other hand his description of cardamomon is very short, and such as he might naturally give of an article so well known as this must have been, from its every-day employment by Asiatics as a masticatory and spice. In addition to this he notices a use of cardamoms peculiar to India, viz., as a lithontriptic in nephritis and dysuria. The description of Dioscorides is as follows, "Cardamomon is brought from Commagene (the northern province of Syria, now Camash), Armenia, and the Bosphorus, but it is produced also in India and Arabia. Choose that which is tough, well-filled, closed; if not in this state it is too old and has lost its aroma. The taste is pungent and somewhat bitter."

I think there can be no doubt that the Greeks were well acquainted with cardamoms through their intercourse with Eastern nations long before the time of Dioscorides, although they had no exact information as to their source. As suggested by Mr. Holmes the amomis of Dioscorides was probably a plant having the same character as his true amomum.

The Pontic and Coptic kinds were probably entirely different plants used as substitutes. We must also bear in mind that plants having no very remarkable properties were used by the ancients, and are still used in the East, as ingredients in perfumes, etc., from some superstitious fancy in connection with them.

Bombay.

THE SEEDS OF BRASSICA IBERIFOLIA.*

BY PROFESSOR C. O. HARZ.

During the last year some samples of white mustard seed were met with in Bavaria which had been supplied by certain firms at Erfurt and Mannheim as the true article, but which, in consequence of the disagreeable and bitter taste of the mustard prepared from them were subsequently returned by a number of customers. A sample of these seeds was submitted to the author for examination, and were found to so closely resemble true white mustard seed in general appearance, as not to be easily distinguished by an ordinary observer. When submitted, however, to a careful microscopical and chemical examination they were found to differ in several respects from the genuine article. In colour the seeds differed only in having a slightly more ochreous hue than freshly gathered white mustard seed, but not much more so than would be the case with white mustard seed which had become darker by keeping. The hilum, however, was noticed to be darker than the rest of the seed. In size there was no appreciable difference, those of *S. alba* varying in diameter from 1·7 to 2·75 mm., and the false from 1·8 to 2·9 mm. In weight one thousand seeds of *S. alba* weighed 4·855 grams, and the same quantity of the false seed 4·973 grams. When the seeds, however, were soaked in water, but removed before they began to sink, a notable difference was observed. The seeds of *Sinapis alba* showed, under a good lens, a well-marked granular or papillate appearance, due to the development of mucilage from the thick-walled epidermal cells, but the false seeds were seen to be smooth and shining, the surface being minutely and densely punctate.

Mixed with the false white mustard seed, a darker seed of a reddish brown colour was observed, which, however, did not present any anatomical differences, and is probably only a variety of the same species.

When a transverse section of the false white mustard seed is examined under the microscope, the epidermis and the two (to four) rows of thin-walled parenchymatous cells immediately beneath it are seen to be strongly compressed, and to form an apparently structureless membrane-like layer of cells (Fig. I., 1). Beneath these

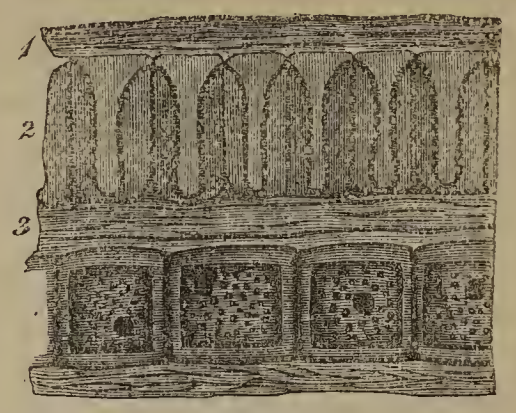

Fig. I.

is found a layer of palisade cells (Fig. I., 2), which seen from above present a polygonal outline with sharply defined regular outline. These cells are 14 to 30 microm. in diameter, and 21 to 28 microm. high. The pale yellow walls are seen to be composed of three layers, which are markedly sclerogenous, a feature which is hardly or not at all noticeable in true white mustard. Beneath the palisade cells is found another layer of strongly compressed and colourless parenchymatous cells similar to those above the palisade cells (Fig. I., 3).

The embryo evidently contains oil, but no starch, and the arrangement of the cotyledons in a longitudinally conduplicate manner indicates (taken in conjunction with the shape of the seed) the section of the Cruciferæ to which it must be referred, viz., *Brassiceæ*. As compared with true white mustard seed, the following microscopical differences are noteworthy.—In the seed of *Brassica alba* the epidermal cells (Fig. II., 1) are

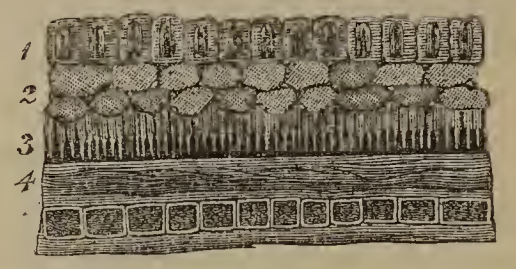

Fig. II.

strongly thickened, and afford mucilage when moistened. Under this layer there are two rows of thin-walled parenchymatous cells (Fig. II., 2), which present collenchymatous thickening at their contiguous corners. These are absent in the false mustard. The palisade cells (Fig. II., 3) also are thin-walled for half or one-third of their length. By these microscopical characters the two seeds can be easily distinguished.

The chemical differences are as follows:—

White mustard, when powdered and mixed with water, is odourless, but the false gives off a strong odour of essential oil of mustard. White mustard affords about 33·03 per cent. of protein, and from 30 to 40 per cent. of a golden-yellow, acrid, fatty oil.

The false mustard seed examined by Dr. F. Wein afforded 22·76 per cent. of albuminous substances, and 45·14 per cent. of fat and oil.

Of the nitrogenous substances present, 89 per cent. were soluble, and 11 per cent. insoluble in alcohol. In dilute alcohol 8·49 per cent. was dissolved, consisting of 1·91 per cent. of myronate of potassium, and 6·58 per cent. of sinapin, or a substance closely allied to it.

Judging from the anatomical characters of the testa of the seed (in the absence of any possibility of examining the pod), the false mustard seed should belong to the genus *Brassica* rather than *Sinapis*.*

But the two kinds of *Brassica* with which it might be compared, viz., *Brassica Napus*, L., and *Brassica Rapa*, differ in the anatomical structure of their palisade cells,

* Abstract of a paper in *Zeitschrift des landw. Vereins in Bayern*, December, 1886.

* In the 'Genera Plantarum' of Bentham and Hooker the genus *Sinapis* is included under *Brassica*.

which gives to these seeds their peculiar reticulated and sculptured surface. As no species of *Brassica* is known to the author having the exact microscopical character of the false white mustard seed, he has provisionally named it *Brassica iberifolia*, because the young plants obtained by sowing the seed present an appearance recalling that of species of *Iberis*.

The mixture of the seeds of *Brassica iberifolia* appears to have been an intentional adulteration, since 100 kilos of true white mustard are worth in Germany 38 marks, and those of the false are valued at 24 marks only.

THE CHEMISTRY OF TYROTOXICON, AND ITS ACTION UPON LOWER ANIMALS.*

BY VICTOR C. VAUGHAN, M.D., PH.D.

Since making my last report on the investigations concerning the nature of tyrotoxicon ('Report of Proceedings of the Michigan State Board of Health,' October, 1886),† I have continued my work, aided greatly by Messrs. F. G. Novy and E. V. Riker. We soon ascertained that if some butyric acid ferment be prepared as is ordinarily done in the preparation of butyric acid, and some of this be added to normal milk, and the whole be kept in closely stoppered bottles for eight or ten days, the poison will be developed in the milk in considerable quantity. The milk should be filtered, the filtrate neutralized with sodium carbonate, and then extracted with ether.

Having a strong solution of the poison in absolute alcohol, which had been obtained from milk inoculated as stated above, we added to it some platinum chloride and began to evaporate on the water-bath. As soon as the alcohol evaporated the residue exploded with great violence. The experiment was repeated a number of times with like results. From some of this alcoholic solution the platinum was removed with hydrogen sulphide gas ; but the filtrate was then found to have lost its explosive property. This reminded us that diazobenzol compounds form with platinum chloride a highly explosive salt, and that diazobenzol is also decomposed by hydrogen sulphide.

Some diazobenzol was prepared according to the method of Griess (*Annalen der Chemie und der Pharmacie*, vol. 137), and comparisons made between this and tyrotoxicon. With equal parts of sulphuric acid and carbolic acid the prepared diazobenzol nitrate gave a green coloration, while with the same reagents tyrotoxicon gave a colour which varied from a yellow to an orange-red. But the diazobenzol nitrate dissolved in the whey of normal milk and extracted with ether, or in the presence of other proteids, gave the same shades of colour as the tyrotoxicon did, and the potassium compound of the tyrotoxicon, prepared by the method to be given later, gives the green coloration. This colour test may be used as a preliminary test in examining milk for tyrotoxicon. It is best carried out as follows :—Place on a clean porcelain surface two or three drops each of pure sulphuric acid and pure carbolic acid. This mixture should remain colourless or nearly so. Then add a few drops of the aqueous solution of the residue left after the spontaneous evaporation of the ether. If tyrotoxicon be present an orange-red to a purple colour will be produced. This test is to be regarded as only a preliminary one, for it may be due to the presence of a nitrate or nitrite. The tyrotoxicon must be purified according to a method to be given farther on before the absence of a nitrate or nitrite can be positively demonstrated.

In the filtrate from milk which is rich in tyrotoxicon, after neutralization with sodium carbonate, filtration, and acidifying with hydrochloric acid, gold chloride produces a precipitate, which is insoluble in water, but soluble in hot alcohol, from which it separates on cooling in golden plates. Diazobenzol give with gold chloride a precipitate having all these properties. In both cases the gold compound is decomposed by frequent treatment with hot alcohol, and this fact prevented any satisfactory ultimate analysis of this compound. It should be remarked here that from some samples of milk this gold salt is obtained much more easily than from others, and the difference is dependent not so much upon the amount of tyrotoxicon present, as upon the condition of the other organic matter present. It is best obtained from samples which have stood in well stoppered bottles for a month or longer.

Thinking it not likely that the diazobenzol existed in the cheese and milk as a nitrate, we prepared some diazobenzol butyrate, and found the crystals of these to agree exactly with those of tyrotoxicon, and that they decomposed with like rapidity when exposed to moist air.

From tyrotoxicon obtained from milk, diazobenzol-potassium hydrate was obtained according to the method of Griess, and the per cent. of potassium in this compound was determined. The filtrate from the milk which had been inoculated with the ferment and kept in a stoppered bottle in a warm room for ten days was neutralized with sodium carbonate, agitated with an equal volume of absolute ether, allowed to stand in a stoppered flask for twenty-four hours, the ether removed and allowed to evaporate from an open dish. The aqueous residue was acidified with nitric acid, then treated with an equal volume of a saturated solution of potassium hydrate, and the whole concentrated on the water-bath. On being heated the mixture became yellowish-brown and emitted a peculiar aromatic odour. Both the colour and odour corresponded exactly with the colour and odour produced by carrying some of the artificial diazobenzol through a comparative test. On cooling the mass crystallized, the diazobenzol-potassium hydrate appearing in the test with the tyrotoxicon, and in the comparative test also, in beautiful six-sided plates along with the prisms of potassium nitrate. The crystalline mass was treated with absolute alcohol, filtered, the filtrate evaporated on the water-bath, the residue dissolved in absolute alcohol, from which the diazobenzol-potassium hydrate was precipitated with ether. The precipitate was collected, washed with ether, dried, and the per cent. of potassium estimated as potassium sulphate. 0·2045 gram of the diazobenzol-potassium hydrate yielded 0·109 gram of potassium sulphate. Per cent. of potassium calculated, 24·42 ; found, 23·92.

Chemists will now appreciate the great difficulty that has been experienced in isolating the active agent of poisonous cheese. The readiness with which diazobenzol decomposes is well known. When warmed with water it breaks up into carbolic acid and nitrogen. Hydrogen sulphide decomposes it ; therefore all attempts to obtain the poison by precipitating it with some base, such as mercury or lead, and then removing the base with hydrogen sulphide, have failed. Moreover, diazobenzol is only a transition product of putrefaction. I have frequently found that leaving some milk rich in the poison in an open beaker for twenty-four hours would be sufficient to destroy the whole of the poison.

The following experiments will show that the effects of tyrotoxicon and diazobenzol upon the lower animals are identical :—

Experiment 1.—From one half gallon of some milk, which had stood in a tightly stoppered bottle for three months, there was obtained quite a concentrated aqueous solution of the poison after the spontaneous evaporation of the ether. Ten drops of this placed in the mouth of a small dog three weeks old caused within a few minutes frothing at the mouth, retching, the vomiting of frothy fluid, rapid breathing, muscular spasm over the abdomen, and, after some time, watery stools. The next day the dog seem to have partially recovered, but was unable to retain any food. This condition continuing for two days, the animal was killed with chloroform. No examination of the stomach was made.

Experiment 2.—Tyrotoxicon obtained from poisonous

* From the *American Pharmacist*.

† *Pharm. Journ.*, [3], vol. xvi., p. 147.

ice-cream was given to a cat. Within ten minutes the cat began to retch, and soon it vomited. The retching and vomiting continued for two hours, during which time the animal was under observation, and the next morning it was observed that the cat had passed several watery stools. After this, although the cat could walk about the room, it was unable to retain any food. Several times it was seen to lap a little milk, but on doing so it would immediately begin to retch and vomit. This condition continuing, after three days the animal was placed under ether, and its abdominal organs examined. We certainly expected to find marked inflammation of the stomach; but we really did find the stomach and small intestines filled with a frothy serous fluid, such as had formed the vomited matter, and the mucous membrane very white and soft. There was not the slightest redness anywhere along the alimentary canal.

Experiment 3.—Some tyrotoxicon obtained from milk which had been inoculated with poisonous cream and allowed to stand for forty-eight hours was administered to a large old cat. It soon produced retching, but no vomiting or diarrhœa. The amount of the poison administered in this case was small.

Experiment 4.—Some tyrotoxicon from milk was given to a young, but full-grown cat. Within fifteen minutes there was marked and evidently painful retching, and within half an hour vomiting accompanied by rapid breathing. Later there were several stools, the first two of which contained fecal matter; but subsequent ones were rice-water like and wholly free from fecal odour. After two days some more of the poison was given, and the vomiting and diarrhœa again induced. The animal was then anæsthetized, and examination of the stomach and intestine showed the mucous membrane blanched, as was found in experiment 2.

We have the records of a number of other experiments with tyrotoxicon on the lower animals; but as the symptoms induced in all were substantially the same, it is unnecessary to note them here. We will now give the effects observed in the lower animals after the use of the prepared diazobenzol.

Experiment 5.—Gave to a large old cat 100 milligrams of diazobenzol butyrate. Immediately the animal began to purge. Then she lay upon the floor breathing rapidly and retching severely for two hours, when she died. The retching was most violent; but vomiting seemed impossible. *Post-mortem* examination showed the lungs greatly congested, but the mucous membrane of the stomach and intestine was not reddened. The stomach contained some food. I suppose that the congestion of the lungs was due to the violent retching.

Experiment 6.—To a young, but full-grown Maltese cat I gave 100 milligrams of diazobenzol butyrate. With most violent retching, but without either vomiting or stool, the animal died within thirty minutes after the administration of the poison. The lungs were found acutely congested, and the stomach free from any redness. The circular fibres of the small intestine were tightly contracted.

Experiment 7.—Gave to a full-grown cat 25 milligrams of diazobenzol butyrate. Within ten minutes vomiting and purging were induced. The first stools contained fecal matter; but the subsequent ones were like rice-water and wholly free from fecal odour. After two days the cat was able to take food; then 10 milligrams more of the poison were given, with the reproduction of the vomiting and purging. The animal then rapidly emaciated, and after a few days it was anæsthetized and the mucous membrane of the stomach and intestine found blanched. The lungs were not congested,

Experiment 8.—10 milligrams of the poison produced profuse diarrhœa and continued vomiting in a cat.

Experiment 9.—75 milligrams produced vomiting and diarrhœa with congestion of the lungs in a dog.

It seems unnecessary to detail any more of these experiments, as the identity of tyrotoxicon with diazobenzol is now established, not only by chemical analysis, but this proof is strengthened, if chemical analysis can be strengthened, by the action of the poison on the lower animals and by the *post-mortem* appearance.

I think it highly probable that diazobenzol or some closely-allied substance will be found in all those foods which from putrefactive changes produce nausea, vomiting and diarrhœa. In some oysters which produced these symptoms I have recently found tyrotoxicon.

Milk or other fluid to be tested for this poison should be kept in well stoppered bottles; for if the fluid be exposed to the air the tyrotoxicon may decompose in a few hours. The filtrate from the milk or the filtered aqueous extract of cheese should be neutralized with sodium carbonate, then shaken with half its volume of pure ether. Time should be given for the complete separation of the ether. Purified tyrotoxicon is insoluble in ether, and it probably owes its solubility in ether at this stage to the presence of impurities. After complete separation the ether should be removed by a pipette and allowed to evaporate spontaneously from an open dish. The residue from the ether may be dissolved in distilled water, and again extracted with ether. To a drop of an aqueous solution of the ether residue apply the preliminary test with sulphuric and carbolic acid. To the remainder of the aqueous solution of the ether residue add an equal volume of a saturated solution of caustic potash, and evaporate the mixture on the water-bath. The double hydrate of potassium and diazobenzol will be formed if tyrotoxicon be present, and this may be recognized by its properties and reactions which have already been described.

A SUMMARY OF WALLACH'S WORK ON THE ESSENTIAL OILS.*

Amongst other subjects in the domain of organic chemistry concerning which recent investigations have increased our stock of knowledge may be ranked the essential oils. Even before the present decade, the essential constituents of the oils of gaultheria, thyme, cinnamon, cloves, mustard and many others were known, and processes had been elaborated for preparing them artificially; but at the same time much in their chemical history still remained without explanation. In literature there existed a number of reports of isolated observations, but these were for a large part contradictory, and lacked co-ordination from a uniform point of view. It had been established by individual investigations that most of the liquid essential oils contain hydrocarbons, free from oxygen, which had been named elæoptenes or terpenes, as well as some oxygenated compounds, usually solids, to which the name stearoptene or camphene had been applied. But since these compounds were hardly ever separated in a pure condition, and in consequence of an importance having been attributed to differences in odour that has turned out to be unjustifiable, they were considered to be chemically different bodies, and had various names given to them accordingly. For the hydrocarbons the final syllable -ene was usually added to the radical of the Latin name of the oil (carvene, citrene, etc.), and for the stearoptenes the final syllable -ol was similarly added (cajeputol, thymol, etc.).

But since the year 1883 some change has taken place in this respect, previous knowledge of the essential oils having been considerably increased by Wallach and his pupils. This chemist, though not himself originally a pharmacist, has been brought closely into contact with pharmacy on its scientific side, he having succeeded the late Professor Mohr in the chair of pharmacy in the University of Bonn. It was this association with pharmacy, probably, that attracted Wallach's attention to the essential oils as a group of compounds the chemical nature of which required elucidation, and led him to

* Abstract from a paper in the *Pharmaceutische Zeitung*, September 10 and October 15.

institute the classical investigation, the results of which it is proposed to summarize in the following paragraphs.

The investigation commenced with oleum cinæ. This oil, according to Völckel, contained a compound $C_{12}H_{10}O$, whilst Kraut considered it to be a mixture of a compound $C_{10}H_{18}O$ with a hydrocarbon, probably $C_{10}H_{16}$. Faust and Homeyer assigned no formula, but disputed the presence of the hydrocarbon that had been named cinene ($C_{10}H_{16}$) and held it to be identical with cymol. Wallach passed hydrochloric acid gas into well-cooled oleum cinæ, and in this way obtained a crystalline hydrochloric acid compound that had been previously observed by Völckel, and from this by suitable treatment with water or alkali a homogeneous body was regenerated, which showed the characteristic properties of the principal fraction of wormseed oil. It formed a volatile optically inactive liquid, boiling at 176°–177° C., having a specific gravity at 16° of 0·92297, and a composition represented by the formula $C_{10}H_{18}O$, being therefore an isomer of borneol. It was named by Wallach "cineol." Cineol combines again with hydrochloric acid to form the previously-mentioned crystalline compound, the composition of which corresponds with the formula $(C_{10}H_{18}O)_2HCl$. This compound, when treated with water or watery solution of an alkali, splits up again into its components, cineol and hydrochloric acid; but when heated in the absence of water it decomposes, the elements of water splitting off according to the equation:—

$$(C_{10}H_{18}O)_2HCl = 2H_2O + HCl + 2C_{10}H_{16}.$$

The $C_{10}H_{16}$ hydrocarbon formed boils at 181–182° C., and has a specific gravity of 0·85384 at 16° C.

Cineol behaves similarly towards hydrobromic acid, but the action of hydriodic acid leads to the formation of a non-oxygenated iodine compound:—

$$C_{10}H_{18}O + 2HI = H_2O + C_{10}H_{18}I_2.$$

The behaviour of bromine towards cineol proved of especial interest to the progress of the investigation. Upon the gradual addition of bromine a bromine addition product ($C_{10}H_{18}O{\cdot}Br_2$) was formed in beautiful red crystals. If these were allowed to stand long in a sealed tube, even in a cool place, they first ran together, and then from the liquid there separated snow-white crystalline scales that in the pure condition melted at 125 5°C. This compound proved to be the tetrabromide of a hydrocarbon having the composition $C_{10}H_{16}Br_4$. Its formation resulted first by the splitting up of the bromine addition product, according to the equation—

$$C_{10}H_{18}O.Br_2 = H_2O + Br_2 + C_{10}H_{16},$$

and then the free bromine combined again with part of the hydrocarbon to form the tetrabromide. Experiments made to ascertain the manner of combination of the oxygen atom allowed of the conclusion that cineol contains neither an hydroxyl group nor an atom of oxygen combined with one atom of carbon, but rather that the oxygen is combined with the same affinity to two carbon atoms. It was ascertained, further, that the hydrocarbon, $C_{10}H_{16}$, to which reference has been made several times, could be most conveniently obtained pure, by decomposing the compound of iodine with cineol by means of aniline:—

$$C_{10}H_{18}I_2 + 2C_6H_5NH_2 = 2(C_6H_5NH_2.HI) + C_{10}H_{16}.$$

This hydrocarbon possesses, when pure, a very agreeable lemon-like odour, and yields upon treatment with bromine a tetrabromide melting at 125° C. It has been named by Wallach "cinene." When treated with strong sulphuric acid or phosphorus pentasulphide cinene is decomposed, with the formation of some cymol, and to this reaction is attributed some of the contradictory results obtained by previous investigators.

After establishing in this manner that the principal constituent of oleum cinæ is represented by cineol, $C_{10}H_{18}O$, the question suggested itself to Wallach, whether the substances present in different essential oils of similar or the same composition were actually different, or whether, possibly, chemically identical bodies were at present to some extent spoken of under different names. For the determination of this question the formation of the hydrochloric acid compound and the characteristic behaviour of the bromide seemed to be specially applicable.

Cajeput Oil.—Upon passing hydrochloric acid gas into the fraction of cajeput oil distilling over between 170–180° C. exactly the same hydrochloric acid compound was formed as previously with oleum cinæ. The same correspondence was shown by the addition product due to the action of bromine and to the tetrabromide (m.p. 125° C.) formed from it. The iodide resulting from the action of hydriodic acid, $C_{10}H_{18}I$, was also identical with that formed from cineol, yielding like it, upon being heated with aniline, the same hydrocarbon, cinene or cajeputene, $C_{10}H_{16}$, with an odour of lemon oil, which upon being treated with bromine also gave the characteristic tetrabromide (m p. 125° C.). It follows, therefore, that the principal constituent of cajeput oil, $C_{10}H_{18}O$ (cajeputol), is identical with the principal constituent of wormseed oil (cineol).

The fact that the hydrocarbons cinene and cajeputene from ol. cinæ and ol. cajeputi were both distinguished by a lemon-like odour suggested the question whether they might not prove identical with the terpenes contained in aurantiaceous oils.

One distinguishing character of cinene is the readiness with which it yields the beautiful crystalline tetrabromide, melting at 125° C. The ordinary terpenes from species of pine did not show this property; neither was a similar compound obtained from ol. eucalypti or ol. bermagottæ, and ol. citri only gave a very small quantity of a crystalline compound. On the other hand, ol. corticis aurantii yielded a considerable quantity of a magnificent crystalline tetrabromide, which melted, however, between 104° and 105° C. It also differed from cinene tetrabromide in its greater solubility in ether and its crystalline form. It was inferred from this that the hesperidene contained in ol. cort. aurantii is probably nearly allied to, but not identical with, cinene (or cajeputene). The fact of the existence of two chemically distinct terpenes, each yielding a characteristic crystalline tetrabromide, was then taken as a starting point in the investigation of other essential oils.

American Turpentine Oil.—The portion of turpentine oil boiling between 159° and 161° C. gave a liquid bromide, from which the existence of a third terpene seemed probable. If this, however, were heated for some time to 250°–270° C., a fraction then distilling over between 175° and 185° C. gave off an agreeable lemon-like odour, and formed a tetrabromide melting at 125° and identical with cinene tetrabromide. Similar alteration of turpentine oil results from the action of acids.

Pine-Needle Oil.—A fraction of this oil passing over between 159° and 165° C. gave a liquid tetrabromide, but after being heated to 250°-270° C. it yielded the solid tetrabromide melting at 125° C. The other portion, passing over between 175° and 180°, which had an agreeable odour, yielded directly a tetrabromide melting at 105° C., identical with hesperidene tetrabromide.

Juniper Oil contains a considerable quantity of a terpene boiling between 155° and 162° C., which does not yield a solid compound with bromine. After heating it a tetrabromide identical with cinene tetrabromide was obtained.

Eucalyptus Oil.—No fraction gave directly a solid tetrabromide. After heating the oil to 270° C. the portion boiling at 180° C. gave a bromide identical with cinene tetrabromide.

Mace Oil contains a large quantity of a terpene boiling at 160° C., which behaves towards bromine like turpentine, juniper, or eucalyptus oils.

Sage Oil.—The same remark applies to this oil as to mace oil. The terpene boiling at 160° C. is converted by heat into a compound boiling at 180° C., which then yields a tetrabromide melting at 125° C.

Orange-Peel Oil consists nearly exclusively of a terpene boiling uniformly at 175°–176° (hesperidene). By direct bromination there results the tetrabromide $C_{10}H_{16}Br_4$, melting at 104°–105° C. But if the hesperidene be first heated to 250°–270° C. it is changed into a product boiling at a higher temperature, which with bromine yields a tetrabromide identical with cinene tetrabromide, melting at 124°–125° C. By the action of hydrochloric acid upon hesperidene a dihydrochlorate results, $C_{10}H_{16}\cdot 2HCl$, which melts at 49° to 50° and is identical with a compound that can be obtained from turpentine oil. When this is treated with aniline a hydrocarbon is split off, which also gives a tetrabromide melting at 124°–125° C.

Lemon Oil.—By fractional distillation a portion boiling at 170° and another boiling at 175°–180° were separated, which accorded with the results obtained by Tilden. The portion with the lower boiling point did not at first give a solid bromide, but after being heated to 250°–270° it gave a tetrabromide melting at 125°. The fraction passing over between 175° and 180°, containing the characteristic citrene, proved by the formation of a tetrabromide that melted at 104°–105 to be identical with hesperidene.

Bergamot Oil.—From a fraction boiling between 175°–180° was formed the tetrabromide melting at 104°–105°, identical with hesperidene. The fraction passing over between 180° and 190° did not form directly a solid bromide with bromine, but after being heated to 250°–270° gave cinene tetrabromide.

Caraway Oil.—The hydrocarbon in this oil, described as carvene, proved to be identical with hesperidene, it yielding the tetrabromide melting at 104°-105°. At first the odour of carvene differs from that of hesperidene, but after separation of accompanying carvol and treatment of the carvene with potassium permanganate the peculiar hesperidene odour becomes distinctly perceptible.

Dill Oil is very similar to caraway oil. It contains carvol and a terpene identical with carvene.

Erigeron Oil contains an abundance of a terpene that boils between 175° and 178°, and is identical with hesperidene.

Caoutchouc yields upon dry distillation several terpenes, among which two are known as "caoutchin" and "isoprene." The caoutchin, boiling at 180°, gave upon direct bromination the tetrabromide melting at 125°, showing it to be identical with cinene. Isoprene, boiling at 34°–39°, was polymerized by heat to a hydrocarbon boiling at 180° C. (diisoprene), which was also identical with cinene.

Rosemary Oil contains, besides a terpene, ordinary laurel camphor, borneol and cineol. The simultaneous occurrence of these three varieties of camphor is of special interest, as showing the great probability of a relationship between them.

Ceylon Cardamoms Oil.—The first aqueous runnings consist chiefly of acetic and formic acids. The peculiar oil boils between 170° and 220°. It contains a terpene, $C_{10}H_{16}$, the boiling point of which lies near to that of limonene or dipentene, but it yields a chloride melting at above 50°. The oil contains also a second terpene, known as terpinene, and a body containing oxygen, $C_{10}H_{18}O$, which stands very near to terpineol, if not identical with it. The resinified distillation residue contains a small quantity of a crystalline body melting at 60°–61°.

Camphor Oil contains in tolerably considerable quantity a hydrocarbon that is identical with cinene and caoutchin.

The results of these observations may be summarized as follows :—

A very large number of the terpenes hitherto called by different names and considered to be different are undoubtedly identical, namely—

1. The portions boiling between 175° and 176° of oil of orange peel (hesperidene), lemon oil (citrene), bergamot oil, caraway oil (carvene), dill oil, erigeron oil and pine-needle oil are identical with one another.

2. The terpenes boiling between 180° and 182°, cinene, cajeputene, caoutchin, diisoprene, and the portion of camphor oil boiling at the same temperature, as well as the product which is formed through the heating to 270° of all the terpenes examined and the hydrocarbon obtained in decomposing with aniline the terpene dihydrochlorate ($C_{10}H_{16}2HCl$), boiling at 49°–50°, from any source, are all identical with one another.

As to how far the terpenes boiling at 160° of the oils of turpentine, pine-needle, juniper, lemon, eucalyptus, mace, dill and sage are identical cannot yet be decided with certainty ; but in any case, at a sufficiently high temperature they are all converted into the same terpene.

The fact that the terpene dihydrochlorate $C_{10}H_{16}\cdot 2HCl$, which melts at 49°–50°, always shows the same properties, from whatever compound it may be obtained, and upon removal of the acid passes into the same terpene, confirms the correctness of Tilden's opinion that the addition products of $C_{10}H_{16}$ to 2 HCl are identical. But since terpenes undoubtedly differing from each other (from turpentine oil, boiling at 160°, hesperidene and cinene) yield the same addition product and pass into the same terpene upon removal of the acid, it follows that these different terpenes are inverted by hydrochloric acid in the presence of water into the same stable modification, into which they are also transformed by heating, and which is formed by the polymerization of the pentane C_5H_8.

In order to give a general idea of the essential oils the principal types of the terpenes were provisionally grouped as follows :—

A. *Hemiterpenes or Pentenes of the Formula* C_5H_8.

To this group belong isoprene and valerylene, which by polymerization pass into (probably) the same hydrocarbon $C_{10}H_{16}$.

B. *True Terpenes* ($C_{10}H_{16}$).

These divide up into several chemically distinct groups, which can again be subdivided, especially by their optical behaviour.

1. Pinene Group.

The terpenes of this group boil at 160°, and yield liquid bromine addition products, nitroso derivatives that melt at 129°, and combine with one molecule of HCl to form saturated compounds. By the action of heat and of acids they are converted into members of other groups. The group includes terebenthene, australene, and several others.

2. Camphene Group.

The terpenes of this group are solid, melt at 50° and boil under 160°. Their behaviour towards bromine has yet to be investigated.

3. Limonene Group.

The boiling point lies between 175° and 177°. The terpene has a lemon odour, yields a nitroso derivative that melts at 71°, combines with bromine to form a tetrabromide that melts at 104°–105°, and with hydrochloric acid to form the dihydrochlorate of dipentene that melts at 50°. At a higher temperature it is converted into dipentene. Hesperidene, citrene, carvene, etc., are described under the name limonene.

4. Dipentene Group.

The terpene boils at 180°–182°. In odour it resembles limonene. It combines with bromine to form a tetrabromide that melts at 125°–126°, and with two molecules of HCl (without undergoing modification) to form a compound that melts at 49°–50°. Diisoprene, cinene, cajeputene, caoutchin, isoterebenthene are designated as dipentene.

C. *Polyterpenes* $(C_5H_8)_n$.

Some of these occur already formed in nature, others result from the polymerization of hemiterpenes and terpenes.

1. Sesquiterpenes or Tripentenes ($C_{15}H_{24}$).

The boiling point occurs at 250°–260°. To this group belong cedrene and cubebene.

2. Diterpene or Tetrapentenes ($C_{20}H_{32}$).

The boiling point is above 300°. Colophene, among others, belongs to this group.

3. Polyterpenes $(C_{10}H_{16})_n$.

Caoutchouc belongs to this group.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, DECEMBER 10, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

"THE WORM (?) THAT DEVOURETH."

WHEN the "patient" patriarch said of the sinner that "the worm shall sweetly feed on him," he might have extended his predication to the righteous man also without fear of challenge, for the idea that after death the body is devoured by worms is—and apparently always has been—familiar to the human mind. But probably in respect to the identity and origin of the toothsome "worm," both the patriarch's contemporaries and our own would manifest less accord. Some of them, for instance, would fancy they saw specimens of the dreadful sarcophagist in the "worms of the earth" that "move out of their holes;" others, not having the fear of PASTEUR or TYNDALL before their eyes, would declare the worm to be a spontaneous product of the corpse it was fated to devour; whilst the truth seems to be that the greater part of the underground consumption is accomplished by the larvæ of insects which in their more perfect form disport themselves in the sun. Indeed it has long been known to entomologists that various flies and beetles, and even moths and spiders, prefer a corpse, if they can get one, as a place of deposit for their eggs. It is, however, not so well known perhaps that these insects manifest epicurean instincts that vary with their species, each of which in selecting a nest for its eggs seems to anticipate that its young, when they attain the larval form, will prefer their putrescent pabulum in a particular stage of decomposition. This is hardly an exaggeration, for different species appear to take up apartments in the cold clay in regular succession, according to the progress of the decay. Careful observation has indeed already put it in the power of the scientific entomologist, by an examination of the *débris* after the manner of a geologist investigating geological strata, to pronounce what larvæ have made a particular cadaver their temporary home, and from these data to deduce approximately the length of time that has elapsed since the dead body was a living being, provided that this does not exceed three years. The study, it must be admitted, is not superficially attractive, but it evidently may have its uses, and in fact it has already been utilized in judicial inquiries.

An investigation that is going on in France as to the sanitary relations of cemeteries, which recently involved the exhumation of a number of bodies in the burial place at Ivry, has contributed some further information on the subject, that has been recently communicated to the Academy of Sciences by M. MÉGNIN. The bodies exhumed, which had been buried for known periods ranging between two and three years, yielded a rich harvest of larvæ, pupæ, moultings, and even perfect insects of various species. Scientific identification of these has shown—as might be expected—that although the larvæ which fed on buried corpses are innumerable as individuals. the species are much fewer than of those which attack dead bodies exposed to the open air. Several species are common to both conditions, but some of them are evidently peculiar to the grave, and two of them were previously unknown. It has also become evident that the larvæ of the Diptera and Coleoptera play a most active part in the disintegration of bodies buried under ground, as they do in those exposed above ground, and that, as has been hinted before, the different species make their appearance in regular succession, not simultaneously. In the corpses that were exhumed after being in the earth two years, it was obvious that the *rôle* of the larvæ of certain dipterous flies (*Calliphora vomitoria* and *Curtoneura stabulans*) had been long played out, it having commenced probably at the time of burial, if not before. These had been succeeded by the larvæ of another dipterous species (*Anthomyia* sp.); whilst the larvæ of still another member of the same order (*Phora aterrima*) had been carrying on the work so recently that myriads of the insects were found still in the pupa stage, not having yet reached the perfect form. As to the Coleoptera, the larvæ of one species (*Rhizophagus parallelocollis*) were still in full activity. It is very curious to learn in respect to this insect that entomologists had no knowledge previously of it in its larval form. The perfect beetle was known to be met with exclusively in the grass of cemeteries, but how little its true business there was suspected seems to be indicated by the generic name of "root eater" conferred upon it. Another curious observation that applies to the last-mentioned two insects is, that whilst the *Phora* larvæ were found feeding exclusively on lean corpses, the *Rhizophagus* larvæ seemed to be just as exclusive in their preference for putrescent adipose matter.

The question naturally arises as to the manner in which these insects gain access to bodies, the majority of which are buried in sound coffins at a depth of more than six feet underground. There can be little doubt that even before burial the eggs of certain dipterous flies are deposited in such parts as the nose and mouth and are buried with the body. This finds confirmation in the fact that bodies buried in the summer months afforded evidence of having fostered an abundance of the larvæ of flies that inevitably occur in the sick-room during warm weather,

whilst bodies buried in the winter were free from any sign of them. As to access after burial, it was found that under the strain of the weight of the superincumbent soil, assisted by the influence of damp, the strongest and best made coffins soon gape sufficiently at their seams to afford ample room for an insect inroad. It is conjectured that in many cases, such, for instance, as that of the beetle already specially referred to, the perfect insect deposits its eggs near the surface of the soil, at a spot under which a marvellous instinct tells it the food required for its offspring will be found at the proper moment in a suitable condition. When the larvæ are hatched, they—probably also directed by the sense of smell—are supposed to make their way down through the earth to their food, after the manner that larvæ with other tastes find their way underground to truffles.

On Wednesday evening next, an Evening Meeting of the Pharmaceutical Society will be held at 17, Bloomsbury Square, at 8 o'clock, when a paper will be read by Emeritus-Professor Redwood on "The Alleged Fundamental Errors in the British Pharmacopœia." It may be useful to add that the "alleged fundamental errors" referred to are understood to be those which formed the subject of a communication from Professor Tichborne read at the Manchester meeting of the British Pharmaceutical Conference (See *Pharm. Journ.*, Sept. 24, 1887, p. 267).

* * *

An Evening Meeting of the Pharmaceutical Society will also be held at 36, York Place, Edinburgh, on Friday next, December 16, at half-past eight o'clock. The papers to be read will be on the following preparations of the Unofficial Formulary of the British Pharmaceutical Conference:—"Liquor Ferri Hypophosphitis," by Mr. A. Gibson; "Emulsio Olei Morrhuæ" and "Tinctura Quillaiæ," by Mr. P. Boa; and "Tinctura Iodi Decolorata," by Mr. J. R. Hill. In addition there will be a general discussion on the B.P.C. Formulary, and samples of all the preparations included in it will be exhibited.

* * *

In the report presented to the Local Government Board by Dr. George Buchanan, as the medical officer of that department, attention is directed to some interesting experiments that have been carried out by Professor Cash on disinfecting agents. The materials employed in these experiments were chlorine, bromine, iodine and sulphurous acid, and the immediate object of the inquiry was to ascertain the relative potency of those substances in destroying the contagia of anthrax and tubercle. It has been found that when employed in solutions of a strength uniformly proportional to their atomic weights, the three haloids do not present any very remarkable difference in their disinfective power, though iodine appears to be the most potent and chlorine the least. This relation obtains in regard to both anthrax and tubercle; but in all cases these agents fail to exercise any disinfective influence when they are employed in very dilute solutions, even when the virus to be destroyed is exposed to their action for a very long time. Dr. Cash gives a preference to the use of these disinfecting agents and of sulphurous acid gas in the form of solution, and if it be necessary to use them in the gaseous condition, he considers sulphurous acid gas to be most suitable for that purpose. He also points out the importance of the fact too often lost sight of in practice, that in the destruction of any disease-producing material by disinfecting agents, it is necessary to take into account the extent to which they are used up by harmless material. Consequently, to ensure efficiency, the quantity of disinfectant used must be proportioned, not only to the actual amount of morbid material to be destroyed, but also to the amount of harmless material with which it may be associated.

* * *

In a communication to the *Lancet* under the heading "Pharmaceutical Weights and Measures," Mr. W. W. Hardwicke complains that since the introduction of the "cental" system into the Pharmacopœia the medicinal weights and measures have become "troublesomely obsolete." This he attributes to the solutions that were formerly prepared as containing so much per drachm or per ounce having now been altered to so much per cent., which, he says, involves the medical practitioner in a great waste of time and much mental labour in having to reduce his drachms and ounces to minims or grains. He suggests that it would help to overcome the difficulty if in future minim measures were graduated on one side in drachms and half-drachms, and on the other in grades of 10 minims up to 200 minims, the first 100 having intermediate 5-minim lines; the ounce measures graduated on one side in half-ounces and ounces, the first half ounce being sub-divided into drachms and the second into two drachms, and on the other side into 25, 50, and 100 minims; and the half-pint measures on one side into half-ounces and ounces, and on the other into grades of 100 minims. Further he proposes that weights should be made according to the gradation 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 40, 50, 60, 100, 250, and 500 grains. It may be remarked that if measures graduated as indicated should be really required, there would probably not be any insurmountable difficulty in obtaining them; but with respect to the weights mentioned, some of them—namely, the 15, 25, and 250 grains—would be illegal, as there are no official standards at present in existence for their verification.

* * *

At the next meeting of the Chemical Society, to be held on Thursday, December 15, papers will be read on "An Apparatus for Comparison of Colour Tints," by A. W. Stokes; "The Sulphonation of Naphthalene," by Dr. Armstrong and W. P. Wynne, B.Sc.; "Isomeric Change in the Naphthalene Series, Nos. 1, 2, 3 and 4," by Dr. Armstrong and Messrs. Amphlett, Williamson and Wynne; "Notes from the Chemical Laboratory of the Yorkshire College of Science:—(1) The Reduction of Chlorates by the Copper-Zinc Couple; (2) The Oxidation of Oxalic Acid by Potassium Bichromate; and (3) A Method of Separating Supernatant Liquids," by C. H. Bothamley; and "The Alloys of Copper and Antimony and of Copper and Tin," by E. J. Ball, Ph.D.

* * *

The next meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, on Thursday, December 15, when a paper will be read by T. A. Ellwood on "Further Investigations on Fixed Oils."

GENERAL MEETING—BENEVOLENT FUND

ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Friday, December 2, at 12 o'clock, for the election of SIX ANNUITANTS.

Mr. MICHAEL CARTEIGHE, President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the twenty-third election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us and report the following result:—

McIntyre, Jessie	4211
Goadsby, Elizabeth	3763
Pownall, Lydia Sarah	3360
Baker, Sarah E.	3242
Collins, Maria	3154
Sowter, Emily Sarah	2957
Jones, Augusta	2332
Spendelow, Mary E.	1241

3734* voting papers were received, of which number 71 were informal (53 unsigned) and were disallowed.

W. K. HOPKIN, *Chairman.*

I. BOURDAS.	E. M. BURDEN.
W. H. SYMONS.	WM. LLOYD WILLIAMS.
EDWARD B. STAMP.	W. R. GOSSLING.
EDWARD N. BUTT.	ROBT. SAML. BATHE.
R. FISHER YOUNG.	T. P. GOSTLING.
WM. ARKINSTALL.	EDMUND WHITE.
A. W. GERRARD.	T. HOWARD HALL.
THOS. S. DYMOND.	PERCY C. POWRIE.
R. S. DAMPNEY.	F. PASSMORE.
JOHN ALLDEN.	W. TOOGOOD FROST.

December 2, 1887.

The PRESIDENT declared the following six duly elected Annuitants:—

Baker, Sarah E.
Collins, Maria.
Goadsby, Elizabeth.
McIntyre, Jessie.
Pownall, Lydia Sarah.
Sowter, Emily Sarah.

On the motion of Professor ATTFIELD a vote of thanks was given to the Scrutineers for their long and arduous duties.

* 5830 voting papers issued.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 7, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Greenish, Hampson, Hills, Newsholme, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Woolley.

The minutes of the previous meeting were read and confirmed.

ELECTIONS.

ASSOCIATES.

The following, having passed the Minor examination and having paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Hutchin, Llewellyn Albert Jas..Saffron Walden.
Parish, Alfred James .....Kidderminster,
Robins, Henry .....Wantage.
Vawser, Arthur .....March.

RESTORATION TO THE REGISTER.

The name of the following person, who has made the required declarations, and paid a fine of one guinea, was restored to the "Register of Chemists and Druggists":—

William Winter, 13, Paulton Road, Southport.

ELECTION OF ANNUITANTS.

The SECRETARY read the minutes of the general meeting, held on December 2, to elect six annuitants on the Benevolent Fund, including the report of the Scrutineers, which will be found in the previous column.

APPOINTMENT OF EXAMINERS.

The Council went into committee to consider the appointment of pharmaceutical chemists as members of the Boards of Examiners.

On resuming the following were appointed the—

Board of Examiners for England and Wales.

Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge, S.W.
Blunt, Thomas Porter, Wyle Cop, Shrewsbury.
Bowen, John William, 13, Curzon Street, Mayfair, W.
Corder, Octavius, 31, London Street, Norwich.
Druce, George Claridge, 118, High Street, Oxford.
Fletcher, John, Montpellier Avenue, Cheltenham.
Gale, Samuel, 225, Oxford Street, W.
Gerrard, Alfred Wm., University College Hospital, W.C.
Greenish, Thomas Edward, 5, Bathurst Street, Sussex Square, W.
Ransom, Francis, Fairfield, Hitchin.
Symons, William Henry, 130, Fellowes Road, West Hampstead, N.W.
Tanner, Alfred Edward, High Cross, Tottenham, N.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.
Thresh, John Clough, The Willows, Buxton.

Board of Examiners in Scotland.

With regard to the nomination of examiners in Scotland, a letter dated December 5 was read from the Assistant-Secretary in Edinburgh, giving the names of the gentlemen nominated by the Executive of the North British Branch.

Mr. BOTTLE asked if any instructions were given to the Assistant-Secretary to report to the Council the business transacted at the meeting of the Executive of the North British Branch in Edinburgh on November 19 last.

Mr. BAILDON said he instructed the Assistant-Secretary to report what occurred to the Council, and if he did not do so it was an oversight on his part. Perhaps Mr. Bottle would state more particularly what he referred to. He quite intended that the Assistant-Secretary should send up, as he had now done, a full list of those who were nominated.

Mr. BOTTLE did not think the explanation was quite satisfactory. The duty of the Executive in the north was to nominate fit and proper persons to be elected by the Council examiners in Scotland. Now, he noticed in a trade journal there was an announcement of what had been done about this matter, and a week later, in the *Pharmaceutical Journal*, there was a condensed report of what had been already published elsewhere; but no proper means had been taken to communicate to the Council what had been done. He held that when the Council relegated to the Executive in Scotland the privilege and duty of nominating fit and proper persons to act as examiners, it was the duty of the Executive to take care that the Council should be properly informed of what was done in the matter. Instead of that, the report first appeared in a trade journal, then in the *Pharmaceutical Journal*, and then the Assistant-Secretary sent to the Secretary in London further information, but it was still on the face of it insufficient, for there was nothing to show that one or more of the gentlemen nominated might not be debarred by reason of age from being appointed. He should like to know if the Chairman of the North British Branch was able to inform the Council that the gentlemen nominated on November 19 were within the limit of age, so that they might be lawfully appointed under the statute.

Mr. BAILDON said he was quite prepared to say that the Executive would not have sent up an invalid nomination.

Mr. RICHARDSON asked if there was an authorised reporter for the North British Branch?

The PRESIDENT: No.

Mr. RICHARDSON thought this accounted for the difficulty. He did not know what Mr. Bottle meant by a trade journal.

Mr. BOTTLE said he referred to the *Chemist and Druggist*. He read there a statement that Mr. Watt asked how were their constituents to know what was done unless their proceedings were reported. He took it that the Council was far more interested in knowing what was being done than the constituents of the North British Branch. The Council was responsible for everything done by the Executive in Scotland, which was a Committee appointed by the Council, and could do nothing else, and it ought to report to the Council, or endless difficulties would arise. Questions had been raised before as to the mode of conducting the business, and he maintained that the mode of transacting business at the last meeting was extremely loose. He thought it was the duty of the Chairman of that meeting to take care that the Council was immediately informed of what had been done with reference to the nomination of gentlemen to fill the office of examiner, before the information was published in any journal. It was within the bounds of possibility that some knowledge the Council might have might induce it to question the nomination, and not proceed to the election of the gentlemen nominated in Scotland, and if such a case occurred it would be much better that it should be done privately and quietly and not go the round of the public journals. He hoped that in future the business transacted by the North British Branch would be in accordance with the regulation under which it was appointed, which said, "The Executive shall report to the Council and forward vouchers annually," etc. He took it it was the duty of the Executive to report to the Council at all times, and certainly at any time when there was any business which it was worth while publishing to the world through the medium of the trade journals.

Mr. BAILDON said he took exception to the statement that the Executive of the North British Branch was a Committee of the Council.

Mr. BOTTLE said it was appointed by the Council.

Mr. BAILDON said it was something more than a Committee. It was, according to its constitution under the resolution of the Council, for the most part an elected body. It was bound in accordance with the resolution to report once a year, or when required, and he failed to see how it had transgressed that resolution. He would admit that there had been an omission on the part of the Assistant-Secretary of which he was not aware until he had been told of it, when he at once directed him to send up the nomination of the examiners to the Council. The position in which the Executive was placed must be borne in mind. At the meeting of the members and associates resident in Scotland, at which the result of the last Executive election was declared, there was a unanimous resolution asking the Executive to consider the question whether its proceedings could be made public in such a way that the constituents should know what was being done. The feeling of the constituents was undoubtedly that there should be publicity, and if the Executive had refused to publish its proceedings in any way, it would have become very unpopular.

Mr. BOTTLE remarked that he made no objection to the report appearing in a trade journal.

Mr. BAILDON said he did not quite understand what the objection was.

The PRESIDENT said he gathered that the objection raised was to the account of the proceedings being published before it was sent to the Council; that the Executive had reported to persons to whom it was not responsible before reporting to the Council.

Mr. BAILDON said it reported to the Council annually.

Mr. BOTTLE said he took exception to that. The duty of the Executive was to send vouchers annually, but to report whenever meetings were held, or anything occurring which required to be reported.

The PRESIDENT said the words were, "or more frequently if required to do so."

Mr. BAILDON said he understood that some communication would be made by the Council when a special report was desired.

The PRESIDENT said, as he understood, Mr. Bottle's point was this: that on such a matter of business as had taken place at the last meeting of the Executive, the Chairman of the meeting should have sent a special report to the Council before taking a new departure in the matter of publishing its proceedings.

Mr. BAILDON said he had been under a misapprehension. He understood that the duty of the Assistant-Secretary was to make an annual report on the state of the branch, of the property, and so on, to the Council, and to report, of course, in the case of the nomination of examiners. He quite admitted that should have been at once reported to the Council, and he certainly gave directions that it should be; if it had not been done in proper form, it was by mistake. He did not quite understand now what point Mr. Bottle wished to have reported upon; or in what way if the proceedings were to be reported at all the Executive could prevent the trade journals getting these reports. He understood the word "required" meant that if the Council wished a report at a certain time, or on a certain point, an intimation would be sent. It was well known to the President and Vice-President, who were members of the North British Executive, that the question as to the admission of reporters was coming up, and if they had been present perhaps they might have helped to keep matters right. He did what he thought right in the matter, and was still at a loss to know what it was considered ought to have been done.

Mr. BOTTLE remarked that until Mr. Baildon had given his assurance on the point, the Council did not know that one or more of these gentlemen was not

debarred by reason of age from acting as an examiner. He thought the Chairman should have instructed the Assistant-Secretary to report fully the names of the gentlemen nominated with an assurance that no one was in any way disqualified. He should like further to say that if the transactions of the Society in Scotland were of such importance that they should be promulgated as they were on the last occasion it would be most desirable that the report should be sent at once to the Council; it would tend to bring the branch more closely in touch with the Council than it was at present. He read in the report to which he had referred some discussion about admitting outsiders to the privileges of the museum, library, etc., and while he did not want to be any barrier to that being done, it did occur to him that, unless there was some special reason to the contrary, the practice in these matters should be the same in Edinburgh as in London. It was not proper that the Council should have to refer to trade journals to know what the North British Branch was doing.

The VICE-PRESIDENT thought some responsibility attached to the President and himself for not being more frequently in Scotland. He always received notice of the meetings, but he did not like putting the Society to too much expense for travelling. He felt that Mr. Bottle's observations were very just, especially with reference to the publication of the proceedings before a report had reached the Council. He suggested that a copy of the minutes of the Executive should be sent up after every meeting.

Mr. RICHARDSON thought the time had come when the Council should appoint a reporter for the North British Branch, who should be responsible to the Council, as its own reporter was. He agreed with Mr. Bottle that this report appearing in the trade journals was not complimentary to the Council, and it reminded him of what took place on one occasion in Leicester, when the whole proceedings and evidence of the witnesses in a certain case was furnished to the newspapers by the police before it came before the magistrates. It would be far better to have a recognised reporter.

Mr. HAMPSON thought it very desirable to bring this discussion to a close, lest any member might unwittingly say something which might hurt the feelings of their brethren in the North. This question should be treated with great delicacy, but at the same time with firmness and dignity. It all seemed to hinge on the report which had appeared in the Press; but for that no comment would have been made. With regard to the particulars of the nominations, he was not aware that hitherto any such particular as to the age or qualifications of gentlemen named had been sent or asked for. It did not turn on that point at all, though, no doubt, there had been some delay in sending the list; it all turned on the question of publication. He would emphasize the remarks of the Vice-President, and hoped that he and the President would take an opportunity of conferring on the matter with the other members of the Executive in Scotland.

Mr. SCHACHT said although the Chairman of the Local Executive might suppose that he had technically answered the question raised by Mr. Bottle, he did not think he had set at rest the difficulty which everyone must feel, especially as he had expressed the opinion that the Executive in Scotland was not, in any sense of the term, a committee of that Council, which again raised the whole question of the relation of the Scotch members to the Council as representing the Society. The proceedings, which were published the other day, first in the two trade journals, and afterwards in the *Pharmaceutical Journal*, must have made the members of Council ask themselves if it was in accordance with the conclusion arrived at some few months ago, after a long discussion. As he read it, it appeared to him a distinct departure from the conclusion which, he understood, was then arrived at; and he consequently referred to what did take place, and found that on November 6, 1886, something like a written constitution was laid down for the North British Branch. The name was declared to be official, and a definition given of it; then there was a clause suggesting that, in order to assist the Council in the management of the North British Branch, an Executive of not more than so many should be appointed, and clauses followed showing the relation which the Executive held to the Council, every one of which seemed to him to imply that it was a Committee practically appointed by the Council, and responsible to it for everything it did. Afterwards there was some discussion in the Council as to the admission of reporters to the meetings, which resulted in the expression of the opinion by the President that if the North British Branch had any idea of admitting press reporters to its meetings that would be entirely unconstitutional, but as he understood that was not contemplated. To this Mr. Baildon was reported to have replied that he did not understand so; that the members of the Executive had not as yet committed themselves to anything, and that he was glad the discussion had taken place, because he was quite alive to the necessity of proceeding with very great caution in reporting the proceedings of such a body, and he should do his utmost to prevent any friction arising. The subject was evidently left open, but the next proceeding of the Executive appeared to have been to take the matter entirely into its own hands, and these gentlemen appeared to have come to the conclusion that they had a perfect right to independent action in such matters, and, as he read it, declared that they would introduce reporters, and do as they pleased with the publication of their proceedings, which practically was what was done, and had led to Mr. Bottle's protest. He thought the matter was a serious one. He did not wish to accuse anybody of doing anything which they did not think they had a perfect right to do, but the position had now arisen which as far back as November, 1886, some thought might arise, which seemed something like an assertion of complete independence of the Council. It might be wise, or not; this was, perhaps, not the time to raise the question; but it seemed evident that that difference of opinion did exist, and sooner or later the point would have to be settled, or else friction must arise. He did not approve, not only of the one fact of sending the nomination of examiners to the press, but of the whole proceedings, the declaration of the right to introduce reporters to allow them to publish what they please without any reference at all to the Council. He was anxious not to stir up strife, but this was a constitutional question which should be determined as speedily as possible.

Mr. SYMES thought the question had been somewhat extended by Mr. Schacht, but he hoped the Council would not go into the general question of reporting. Some notice ought to be given before discussing it. Attention had very properly been called to what appeared to be an irregularity, but he did not see that the Executive was bound, by the clause which had been referred to, to report oftener than once a year unless required to do so. He did not think their friends in the North had taken up this matter in an antagonistic spirit at all, and he should be very sorry if, directly a difficulty had been settled which had existed some time and caused a certain amount of heartburning, when everyone had declared his intention to bury the hatchet and try to work amicably, some fresh difficulty of a technical kind arose to interfere with the smooth working of a body which was acting for the public good. After what had passed there was no doubt that reports would be sent more frequently, but up to the present moment he did not think there had been any request for a report more than once a year. It was admitted that there had been an oversight, for which Mr. Baildon had expressed his regret, and he could not believe that any slight had been intended to the Council.

Mr. SOUTHALL agreed with Mr. Symes. He thought it would be a pity if all the proceedings of the North

British Branch had to be submitted to the Council before they were published. They all knew how difficult it was to get the members in England to take an interest in the proceedings of the Society, and he presumed it was the same in Scotland, and if the publication of these proceedings were delayed for a month the chances were that they would take still less interest in them.

Mr. RICHARDSON remarked that this was not an ordinary report. It was the election of a very important body of officers to carry on a very important part of the Society's operations.

Mr. BAILDON said he understood that the list of gentlemen nominated had been sent; was it contended now that it was not in proper form?

The PRESIDENT said a communication had been received from the Assistant-Secretary stating that at a particular meeting certain gentlemen were nominated; but it had been reported through other channels that the Executive had done a number of other things which had not been reported to the Council. That was the question raised by Mr. Bottle. He thought that having to report on the nomination the Executive might have reported on the other business, and also that it ought not to have published the names of the nominees for such an important office before these names had been considered by the body which had to appoint them. He thought Mr. Bottle desired to point out to Mr. Baildon, as Chairman of the Executive, the difficulties which would arise if great care were not taken in these matters. It was a very awkward thing when a body, formed as this was to assist the Council in the maintenance of the branch, published beforehand something which might be disapproved of altogether. Very likely Mr. Baildon might have called the attention of the Executive to the danger of that. Having often trodden the thorny path of Chairman he did not envy the present Chairman of the Executive or his successors if they went on the lines they now proposed, for he thought they would find themselves in a great deal of difficulty. Probably the Council would adopt Mr. Symes's suggestion, and let the discussion cease for the present, and possibly he and the Vice-President might go down to Scotland at the next meeting of the Executive and have a conversation with the other members on the subject if they desired it. It was quite certain that the Executive was the assistant of the Council, and all through it had been admitted that the Executive owed allegiance to the Council. The Chairman of the Executive had expressed certain views there which did not point to open reporting, and he himself had expressed similar views, but notwithstanding all that the Executive not only passed a resolution apparently at the end of the meeting, admitting reporters, but the whole proceedings antecedent to that resolution being passed were reported. It certainly looked as if it had been done to prevent this action being criticized. He thought it a pity that the Chairman in his discretion did not consider it wise not to commence the publication with that day's proceedings. If there had been a discussion at that table whether the proceedings should be reported, he should have thought the proper way would be to decide the question, and then as a result of the resolution publish the proceedings of future meetings.

Mr. HAMPSON asked if this question of reporting the proceedings appeared upon the agenda calling the meeting, so that the President and Vice-President might have an opportunity of joining in that particular discussion?

The PRESIDENT said he no doubt received notice of the meeting. He did not take any technical objection on that ground.

Mr. BAILDON said he had no doubt the question of reporting appeared on the notices sent to the President and Vice-President, as it did on all the rest.

Mr. HAMPSON remarked that if that were the case it removed to a certain extent the responsibility from the Chairman of the Executive and put it to some extent on other persons.

The PRESIDENT said he was quite ready to take his share of the responsibility, but he thought the Council would see that after the conversation which took place at the Council meeting in August last, he naturally thought that the question would have been dealt with in a somewhat different manner.

Mr. ATKINS did not see that the responsibility was to be fastened on the President or Vice-President, even if the agenda did contain a notice that the subject of reporting would be discussed, because no consideration of that kind could overrule any previous discussion which had been arrived at with regard to the constitution of the North British Branch Executive. He felt very strongly that it was very undesirable by any unwise utterances to accentuate a difficulty which he had fondly hoped had been definitely settled. The particular question which Mr. Bottle had raised had been answered, but not the general question. Mr. Baildon had from the first admitted that an omission had been made by the Assistant-Secretary, for which he had expressed his regret, but after all that was but the fringe of the question. There still remained behind the question, what was the exact position with regard to reporting? Did the North British Branch claim the right to have its business meetings reported independently of any previous report being made to that Council? Was the business of the North British Executive in any sense different from the work of a committee sitting in Bloomsbury Square? It all seemed to him to turn on that one point. He took it Mr. Baildon did claim on behalf of the Executive a somewhat different, higher and more independent position than that of any committee there, and he did not think the discussion had at all cleared up that point.

The VICE-PRESIDENT thought it a great pity that any question as to the position or functions of the Committee or Executive should be raised. The duties of the Excutive were clearly particularized, and it would be a great pity that a discussion should be raised about it.

Mr. SCHACHT thought that was the very question which required to be cleared up; was it or was it not an independent committee?

The PRESIDENT said it was an independently appointed committee, but it was clearly a dependent committee. Its very object was to assist the Council, and, unfortunately, it had taken quite a new departure. He must confess that whatever resolution had been passed he should have thought it would have been sent to the Council before being acted upon. The point he took, with all deference to Mr. Baildon, was this, that in such an important matter the Council ought to have been consulted to see whether it would provide an official reporter, provide the funds, etc., or not. He knew the view which Mr. Baildon's colleagues took, that they were not a committee of the Council, but it did not matter what they considered themselves, they were a committee appointed to assist the Council and responsible to it, and the moment they took a new departure he thought it was the duty of the Chairman to point out the importance of it before proceeding farther, because friction must inevitably arise. Could Mr. Baildon explain how it was that at a meeting called to consider the subject a report of the whole business appeared, indicating that the reporters were in the room before the subject of reporting was discussed and decided? The resolution appeared to have been made retrospective in its operation, as everything done antecedent to the passing of the resolution was reported in full. In the whole of his experience he had never heard of such a thing as that.

Mr. RICHARDSON did not think there was one member of the Council who wished to say a word which would give pain to their brothers in the North. What they wanted was, if they kicked over the traces a little bit, to call their attention before they went too far to any little

irregularity. He agreed with the President that before the reporting of the North British Branch proceedings was carried into effect, the resolution ought to have been submitted to the Council so that there might be a proper reporter appointed to report what was necessary.

Mr. SCHACHT said he should like to have a clear and simple declaration from Mr. Baildon whether on behalf of his Committee he claimed practical independence of the Council. He made that request in no sense disrespectfully to the gentlemen in the North, but he did want to clearly understand what the situation was. He would never raise his voice against anything the Executive did, if it were determined that it had a right to do that thing, but it ought to be made clear what position the Executive really held.

Mr. SYMES protested against Mr. Baildon being called upon to answer such a question; it was putting him in a very unfair position. He could not be expected to answer the question on his own responsibility without consulting his colleagues.

The PRESIDENT said he thought Mr. Schacht should not press Mr. Baildon for an answer. He had already assented to the proposition he put to him that the Committee was responsible to the Council.

Mr. HAMPSON moved that the Council proceed to the next business. All this conversation was, more or less, irregular, there being no motion before the Council.

Mr. CROSS seconded the motion.

The PRESIDENT said it would be discourteous to Mr. Baildon not to allow him to say anything he wished in reply.

Mr. BAILDON said he was still a little uncertain what was the particular form of censure which was wished to be passed on the proceedings at the last meeting of the Executive. He quite understood the difficulty which had been commented upon, namely, that the resolution which came at the end of the meeting seemed to have been held by some persons present to have a retrospective action; but he might say that there was no one present who had not a right to be present at the first part of the meeting, none but the members of the Executive. If any of those persons reported the proceedings, it was not his business to defend them or to say anything about them, but there was no outsider present. Those gentlemen, whoever they might have been, seemed to have considered, without consulting him personally, that the resolution was retrospective, and that they were at liberty to report the whole of the meeting. He was sorry the question was not raised and considered at the time, but there had been a long discussion, and the result of a number of speeches was a general feeling in favour of publicity. There was no feeling of anything like an *émeute* against the Council. If he had misread the Constitution of the branch, and it was expected to report every meeting to the Council, that should be explicitly stated, and he did not think there would be the least objection; but his understanding clearly was that an annual report only was expected, and there had been an annual report for a long time. Their understanding was that the annual report to the Council would be the usual thing, which would be sent at such a time as to be incorporated with the general report of the Council; but no possible objection could be raised to reporting at any time if the Council chose to sanction it. He quite admitted and saw at the time the extreme awkwardness of the publication of this resolution with regard to the Board of Examiners. It was sent to the Council; but unfortunately it did not occur to him that those who reported for the trade journals would consider the motion retrospective. In future if there were anything in the proceedings which it was not desirable to publish until it came before the Council, the Executive could proceed as was done there by the Council, by going into committee.

The PRESIDENT asked if reporters were present at the conclusion of the meeting?

Mr. BAILDON said no one was present throughout but the members of the Executive. Any person who reported the meeting must have been one of those present officially. He was never consulted as to what should be reported, and must disclaim all responsibility in the matter. He trusted that this matter would not be too much pressed, because he thought so far as his observation went there was no wish to do anything unconstitutional. It was simply the dilemma in which the elected members were placed that they were urged by those who sent them to make their proceedings more public, and he did not see how they could help it. At the same time under the resolution constituting the body, they were bound at any time, as indicated by the Council, to send a report to it.

The following gentlemen, whose names had been sent up for the Executive of the North British Branch, were thereupon unanimously appointed examiners for Scotland:—

Board of Examiners for Scotland.

Clark, William Inglis, 104, South Canongate, Edinburgh.
Dott, David Brown, 24, Castle Street, Edinburgh.
Gibson, Adam, High Street, Leven.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John B., 48, Frederick Street, Edinburgh.

A vote of thanks was passed to the Boards of Examiners for their services during the past year.

Retirement of Mr. J. S. Linford.

It was also resolved unanimously, on the motion of the President:

"That this Council desires to place on record its high appreciation of the services rendered to the Society by Mr. J. S. Linford during the seventeen years he has acted as an Examiner for England and Wales."

The PRESIDENT, in putting the motion, said Mr. Linford was no longer eligible on account of his age now exceeding the limit prescribed by the Bye-laws, but he was quite sure the Council, as well as his colleagues on the Board, were very sorry to lose his services. He could only hope that the interest Mr. Linford had always taken in the welfare of the Society would continue, and he would render it all the assistance he could.

Meetings of the Boards of Examiners in 1888.

It was also decided that the Boards of Examiners for England and Wales should meet during 1888 in the months of February, April, June, July, October and December; for Scotland in the months of January, April, July and October.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted on the motion of the PRESIDENT, and various accounts were ordered to be paid.

Amongst the recommendations was the payment of a further sum not exceeding £1000 to the contractors for the new building during the month of December on the architect's certificates.

Mr. BUTT suggested that as there was £751 to the credit of the Benevolent Fund, and as there was a considerable amount of donations not yet invested, £500 should be invested before the end of the year.

Mr. ROBBINS said there were a good many payments falling due, and it would be very inconvenient to invest money at present. No doubt in the course of next year investments would be made of all the donations which had been received.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to a registered chemist and druggist (aged 66), who has had two previous grants. Applicant is in ill health, which prevents him doing much. (Surrey.)

£5 to a registered chemist and druggist, female (aged 61), who has had twelve previous grants, amounting to £100. Unable to do much from ill health. (Edinburgh.)

£10 to the widow (aged 55) of a registered chemist and druggist. Applicant has had three similar grants of like amount, has six children, one of whom only can render her any assistance. (Norfolk.)

£5 to the widow (aged 39), of a former member and subscriber. (London.)

£15 to the widow (aged 59), of a registered chemist and druggist. An unsuccessful candidate at the late election. (Wilts.)

£15 to the widow (aged 57), of a registered chemist and druggist, also an unsuccessful candidate at the late election. (Lancashire.)

£10 towards the support of the Isherwood orphans.

Three other cases the Committee had declined to entertain.

The VICE-PRESIDENT moved that the report and recommendations be received and adopted. There was nothing calling for particular comment, except to point out that sympathy with the unsuccessful competitors at the last election had weighed with the Committee in recommending these grants.

The resolution was adopted unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
October	Day . . .	549	39	10	21
	Evening .	219	18	6	10

Circulation of books.	Town.	Country.	Total.	Carriage paid.
October. . .	155	154	309	£1 18 9

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Lojander (H), Beiträge zur Kenntnis des Drachenblutes, 1887. From Professor FLÜCKIGER.

University College, Liverpool, Calendar, 1887. From Dr. C. SYMES.

Ephemeris, vol. 3, no. 2. From Dr. SQUIBB.

Philosophical Society of Glasgow, Proceedings, vol. 18. From the SOCIETY.

Flückiger (F.A.), Pharmaceutische Chemie, 2. Aufl., 1888. From the AUTHOR.

United States of America, Department of Agriculture, Methods of Analysis of Commercial Fertilizers, Feeding Stuffs, and Dairy Products, 1887. From the DEPARTMENT.

— Surgeon General's Office, Index-Catalogue of Library, vol. 8. From the SURGEON-GENERAL.

Radcliffe Library, Catalogue of Transactions of Societies, Periodicals, and Memoirs, 4th ed., 1887. From the RADCLIFFE TRUSTEES.

Maiden (J. H.), Some New South Wales Tan-Substances, 1887, pts. 1–2. From the AUTHOR.

Medical Faculty of the Imperial University of Japan, Mitteilungen, Bd. 1, No. 1, 1887. From the FACULTY.

For the Library in Edinburgh—

Ephemeris, vol. 3, no. 2. From Dr. SQUIBB.

Alumni Association of the Philadelphia College of Pharmacy, Annual Report, 1887. From the ASSOCIATION.

On the Remedies used by the Caffres to prevent Blood Poisoning from Anthrax. From Dr. R. PEEL RITCHIE.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Bentley, Organic Materia Medica, 1887.
B. P. C., Unofficial Formulary, 1887.
Deschanel, Natural Philosophy, 9th ed., 1886.
Muter, Analytical Chemistry, 3rd ed., 1887.
Naegeli & Schwendener, The Microscope, 1887.
Crookshank, Manual of Bacteriology, 2nd ed., 1887.
De Bary, Comparative Morphology and Biology of Fungi, Mycetozoa and Bacteria, 1887.
Laborde & Houde, Le Colchique et la Colchicine, 1887.
Remington, Practice of Pharmacy. *Another copy.*

For the Library in Edinburgh—

Roscoe & Schorlemmer, Chemistry, vol. 3, pt. 3.
B. P. C. Unofficial Formulary.

The Committee recommended that the Society's publications be forwarded to the Medical Faculty of the Japan University.

Museum.

The Curator's report had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
October	Morning .	671	45	5	24
	Evening .	109	16	3	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Specimen of Oxynaphtoic acid and of Basic Salicylate of Mercury. From Dr. F. VON HEYDEN'S Successor, Dresden.

Specimen of Aracina Gum from Brazil. From Dr. ATTFIELD.

Specimen of Oil of *Pinus Pumilio.* From Messrs. G. & G. STERN.

Specimen of the Oil of *Pinus Sylvestris.* From Dr. A. H. WOOD.

Specimen of the following rare chemicals :—Acid. hippuric., acid. lævulinic., acid. uvitoninic., acid. usnic., acid. vanillic., hexachlor-benzol, artificial borneol, calcium bimalate, calcium hippurate, myristin, olivil, orcein, phloroglucin, potassium bisaccharate, potassium mellonate, phenanthraquinon, protein, trehalose, tyrosine, umbelliferon, crystallized glycocoll, harmine, hæmatoxylin, hydroxylamine hydrochlorate, isatin, keratin, legumin, leucine. From Dr. THEODOR SCHUCHARDT, Goerlitz.

Three pods of a species of Strophanthus from the Niger district, W. Africa; and one from Sumatra. From Messrs. T. CHRISTY & Co.

Three meetings of the Committee had been held. At the first, the question of increasing the facilities for teaching practical pharmacy in the School had been discussed at great length and adjourned.

The members of the staff of the School had attended and reported favourably of their respective classes.

At an adjourned meeting, a draft scheme for the formation and equipment of a research laboratory had been considered and amended, and the further consideration of the subject adjourned.

At a further adjourned meeting, the Committee had had under consideration a scheme submitted by Mr. Ince for laboratory pharmaceutical work, so as to offer facilities for teaching practical pharmacy. He recommended that the Octagon Laboratory be fitted up and opened for practical work on two afternoons a week during the months of March, April, May and June; a list of the apparatus required and the work proposed was also submitted. The Committee recommended that the plan be tried in the spring of 1888, and that the question of how far and in what way the course could be continued hereafter, should be again brought before the Council.

The PRESIDENT, in moving the adoption of the report, drew attention to the recommendation with regard to teaching practical pharmacy. It was proposed that Mr. Ince's scheme be adopted, and that a fee of two guineas be charged for the course of instruction. The difficulties of giving a very full and complete course of instruction in that or any other similar institution lay more in the time required by the individual to acquire it than in anything else. This had weighed considerably with the Committee; but it was believed that the course now suggested would prove of considerable advantage, and that it would make the present course in pharmacy complete, as far as it went, and any other course would be better adapted for those who had passed the examination than for students who were still preparing for that test. It was proposed that the course be commenced next year, and that Mr. Ince report on the result of the work, so that if there was any modification to be made it could be dealt with in the succeeding session.

Mr. SYMES said although this scheme for teaching practical pharmacy fell considerably short of what he had originally contemplated, he might say that on going thoroughly into the matter the facts brought before the Committee were such as to show that the time at the disposal of the students was extremely small, whilst if the scheme was carried out on a more liberal scale there would be difficulties arising from this cause. The Committee had also considered the question of giving Mr. Ince's scheme a trial, so as to ascertain whether there was a real need for this instruction, or whether the want was imaginary. He did not think it was imaginary, but he was sure that if it had not been for the difficulty to which he had already alluded, the Committee would have sanctioned expenditure necessary to try the experiment on a larger scale. As the matter stood, he thought the present proposal was a very fair one; he trusted it would meet with a fair chance of success, and it would then be possible to judge of its value. He was quite sure that even in this modified form it would be valuable, and by next year the Council would be able to judge how far it might be extended or modified.

Mr. HAMPSON said there had been a very considerable discussion at the Committee with regard to the financial position, and the means of sustaining the laboratory for practical research, and very important figures had been laid before the Committee. He thought some reference would be made to this subject in the report.

The PRESIDENT said there was no report made by the Committee, and, therefore, it was not included in the report. Materials were given to the Committee for consideration, and at a future meeting the whole matter would be decided on in view of the whole circumstances, financial and otherwise.

Mr. ATKINS said the Committee could scarcely report until there was something decided upon. With regard to the teaching of practical pharmacy, he did not think so interesting and important a matter should be passed over without comment. He wished most emphatically to give his support to the scheme, which he believed was the right thing, and he was glad to hear Mr. Symes say that he accepted this as an instalment. If it grew, as he hoped it would, it could be developed hereafter. He thought it desirable to say that in entering on this new venture of teaching pharmacy more practically, the Council was doing work which was essentially the work of the Society as an educating body.

The report and recommendations were unanimously adopted.

BUILDING.

The report of this Committee referred only to a complaint from a person interested in property in the neighbourhood of the new building.

It was received and adopted.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, reporting progress on the cases which had been placed in his hands.

W. E. Garner, 226, Horninglow Road, Burton-on-Trent, had paid into court £10 19*s*, for two penalties and costs.

W. B. Mason, 3, Albion Street, and 14 and 16, Arcade, Leeds,

had paid into court £21 15*s*. 2*d*. for four penalties and costs. This person has already paid penalties on two previous occasions.

Walter Fletcher, Sandy Lane, Skelmersdale,

had paid £27 4*s*. 10*d*. for five penalties and costs. This person has already paid seven penalties on previous occasions.

R. S. Hull, Dock Street, Monkwearmouth,

had paid £6 14*s*. 2*d*. under an execution to recover balance of penalties and costs.

W. H. Wilkinson, Commercial Buildings, Normanton,

had paid £5 5*s*. penalty and nominal costs.

J. W. Law, York Road, Leeds,

had remitted £5 5*s*. penalty and costs for the sale of poison.

J. S. Mitchell, 3, Queen Street, Barnsley,

had paid £10 5*s*. for two penalties and costs.

The Committee had had several other cases before it of alleged infringement of the Act, in some of which proceedings were recommended.

This report was considered in committee.

On resuming, the report and recommendations were adopted.

CORRESPONDENCE.

Pharmaceutical Society of South Australia.

A letter was read from Mr. W. H. Harrison, President of the Pharmaceutical Society of South Australia, thanking the Society for the donation of specimens of vegetable materia medica, and stating that the value of the gift to students and others was fully appreciated and formed a constant theme of congratulation.

Pharmaceutical Society of Australasia.

A similar letter was read from Mr. Shillinglaw, Hon. Secretary from the Pharmaceutical Society of Australasia, to whom a similar donation had been sent.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The second ordinary meeting was held at the Blackfriars Hotel on Wednesday evening, December 1. Mr. Redhead, Reporter on Pharmacy, in the chair.

The minutes of the previous meeting having been read and confirmed, a letter from Mr. H. Wilson was read, tendering his resignation as honorary secretary. It was moved that the Chairman should write to Mr. Wilson explaining the difficulty at the present time in appointing a successor, and that he be requested to reconsider his resignation, and if possible continue to undertake the duties *pro tem.*

It was moved by Mr. W. Gibbons, seconded and carried unanimously, that a social evening be held on Thursday evening, December 15, for members and their friends; also that invitations be sent to the members of the Oldham Chemists' Assistants' Association.

Mr. W. Elborne then read a "Note on *Rosa gallica.*" After the reading of the paper there was a good discussion, in which the Chairman, Mr. Husband, Mr. Gibbons and other gentlemen took part.

Among numerous topics brought forward by members for discussion were the dispensing of some prescriptions, introduced by the Chairman, who had had recently the following prescriptions to dispense:—

℞ Tinct. rhei co. . . . . ℥ii.
Sodii bicarb. . . . . ℥iii.
Liq. strychninæ . . . . . ℥iss.
Tinct. card. co. . . . . ℥iii.
Inf. cinchon. . . . . ad ℥viii.
Ft. M.

If dispensed the result would be that the sodii bicarb. would neutralize the acid contained in the liq. strychninæ, with the inevitable result that the alkaloid would be precipitated to the bottom of the bottle, and the patient would probably get it all in the last dose, which would no doubt be fatal.

The following had also been brought to him by a *confrère* for his opinion:—

℞ Pot. iodid. . . . . ℥iii.
Liq. hyd. perch. . . . . ℥iv.
Quinin. sulph. . . . . ℥ss.
Acid. hyd. dil. . . . . ℥ii.
Inf. gent. co. . . . . ad ℥vi.
Ft. M.

If that were dispensed, the result would be a deposition of mercuro-iodide of quinine, which is evidently not the prescriber's intention, and he should be consulted.

The following was also handed to him:—

℞ Pot. chlor. . . . . ℥iss
Acid. hydroch. dil. . . . . ℥ss.
Glycerin . . . . . ℥ss.
Acid. carbol. . . . . ♏ viii.
Tinct. kramer. . . . . ℥iii.
Aq. . . . . ad ℥viii.
Ft. M.

This had been dispensed, with the result that an explosion occurred. He pointed out that, owing to the mixture being kept in a warm room, under the influence of heat the acid had reacted on the pot. chlor. and euchlorine was produced; hence the explosion.

Mr. Husband then made some remarks concerning his experience with the stability of solutions of saccharin. He said he had found that nearly all the solutions prepared by the published formulas, after keeping from seven to fourteen days, deposited upon the bottom and sides of the vessels in which such solutions were kept, a mass of long tubular fungoid growths, and yet saccharin was considered to be a valuable antiseptic.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society held on Thursday, December 1, Mr. William Crookes, F.R.S., President, in the chair, a number of certificates were read for the first time, and the following were elected Fellows of the Society:—Messrs. Calder, H. W. Crowther, T. A. Dickson, C. A. Fawsitt, D. R. S. Galbraith, J. C. A. Hall, J. G. Heywood, C. J. Head, W. Hogbin, S. Lees, jun., D. Lennox, E. Luttgen, J. McArthur, A. Mackay, S. Martineau, W. E. Matthews, J. A. Miller, B.Sc. J. C. H. Mingaye, A. R. Ormiston, J. Ostersetzer, A. W. Taylor, J. M. Vargas, J. S. Ward, and B. W. Winder.

The following papers were read:—

The Alleged Existence of a Second Nitroethane. By W. R. Dunstan and T. S. Dymond.—The authors have repeated the experiments of Kissel (*Jour. Russ. Phys. Chem. Soc.*, 1882, 226—230; and 1884, 135—140), who alleges that when the interaction of ethyl iodide and dry silver nitrite takes place at 0°, no ethyl nitrite is formed, but nitroethane, together with a new isomeride (b. p. 29—30°), which though possessing certain of the properties of ethyl nitrite, appears to be more closely allied to nitroethane. The authors were unable to isolate any such substance. They show that by carefully fractionating the liquid obtained from the interaction at 0° of ethyl iodide and dry silver nitrite, it may ultimately be resolved into ethyl nitrite and nitroethane, and further, that fractions which distil at low temperatures (below 100°) exhibit the chemical properties of a solution of ethyl nitrite in nitroethane.

An Extension of Mendeléeff's Theory of Solution to the Discussion of the Electrical Conductivity of Aqueous Solutions. By Holland Crompton.—The method made use of by Mendeléeff in his paper on "The Compounds of Ethyl Alcohol with Water" (*Chem. Soc. Trans*, 1887, 778) in which the dependence of change of relative density on percentage composition was considered, has been applied by the author, at Dr. Armstrong's suggestion, to the discussion of the electrical conductivity of aqueous solutions, the determination, given by F. and W. Kohlrausch being made use of for the purpose. The curve obtained in the case of sulphuric acid, representing change of conductivity with percentage composition $\frac{dk}{dp}$ as depending on the conductivity, was not found to give evidence of the presence of any hydrates in solution. A second differentiation was therefore resorted to and the coefficient $\frac{d^2k}{d^2p}$ plotted out for different percentage compositions. The curve thus obtained has an undoubted rectilinear character and is discontinuous, having breaks at points corresponding to hydrates of the composition $H_2SO_4 \cdot OH_2$; $H_2SO_4 \cdot 2OH_2$; $H_2SO_4 \cdot 6OH_2$; $H_2 \cdot SO_4 \cdot 24OH_2$; and $H_2SO_4 \cdot 150OH_2$. The presence of all these hydrates, with the exception of that with 24 molecules of water, in aqueous solutions of sulphuric acid has already been recognised by Mendeléef, who deduced their existence by discussing the change in density of such solutions by the same method that he employed in the case of ethyl alcohol. It is concluded from this that the electrical conductivity of sulphuric acid solutions cannot be a continuous function of the percentage composition, but that it is influenced by certain hydrates existing in the solution, indication of the presence of which is afforded by the second differential coefficient curve. A certain irregularity exists at each end of the second differential coefficient curve, where the pure compound may be said to first undergo dilution. This is regarded as representing an initiative stage during which the action of the compounds just beginning to be formed has not come fully into play and the conductivity is influenced by a number of physical actions here probably taking place. It is also pointed out that no break occurs on the second differential co-efficient curve corresponding with the maxima observed on the conductivity curve, as the maxima are found to occur at points intermediate between the breaks on the second differential curve. The influence of both hydrates present on the conductivity seems to determine the maximum, which probably represents that the sum of the influence of each is here greatest. Further confirmation of these facts is obtained by the discussion of other solutions, all of which are found to act in a manner similar to sulphuric acid. In the case of nitric acid there is evidence of the formation of two hydrates $HNO_3 \cdot 15OH_2$ and $HNO_3 \cdot 4OH_2$; and in that of phosphoric acid of the two hydrates $H_3PO_4 \cdot 8OH_2$ and $H_3PO_4 \cdot 2OH_2$, the presence of the same hydrates being also indicated in each case by Mendeléeff's curve for change of density. In the case of potassium and sodium hydroxides the hydrates appear to be the same, namely, one with ten or eleven, and one with six molecules of water. The fact that the second differential co-efficient is a rectilinear function is regarded as evidence that the conductivity is a function of the third order of the percentage composition—

$$K = A + Bp + Cp^2 + Dp^3,$$

this function, however, being only continuous between the limits indicated.

Note on Electrolytic Conduction, and on Evidence of a Change in the Constitution of Water. By Henry E. Armstrong.—In this addendum to the foregoing paper,

the author claims the results in the support of the hypothesis which he has elsewhere advocated that electrolysis is not a mere dissociation phenomenon but depends on an influence which one set of molecules exerts on another set while both are under the influence of the electromotive force. Discussing the first differential coefficient curve, he points out that the influence is exerted almost entirely at two points : in the interval between the acid and the hydrates $H_2SO_4 \cdot OH_2$ and $H_2SO_4 \cdot 2OH_2$; and especially in the interval between the two hydrates $H_2SO_4 \cdot 6OH_2$ and $H_2SO_4 \cdot 24OH_2$. It is suggested that the comparative smallness of the effect in the former case is due to the acid being present in a "polymerized" less active state, and that the lower hydrates are perhaps also derivatives of a polymer of H_2SO_4. Indication is afforded by a break in the curve of the existence of a compound $2H_2SO_4 \cdot SO_3$. The author is informed by Dr. Messel that on mixing the anhydride and acid crystallization first takes place when the mixture has about the composition of such a compound, thus confirming its existence. It is suggested that peculiar breaks in the curve when a small percentage of acid is present with the water, or *vice versâ*, are evidence of a change in the molecular composition of the fluids. Lastly, it is suggested that the electrolysis of fused salts may be supposed to take place in the same way as that of solutions, *i.e.*, that they contain molecules of different orders of complexity capable of influencing each other, and that it is no longer necessary to suppose that there is any fundamental difference in the mode in which the two classes of electrolytes are affected.

The President remarked that the results obtained by Mendeléeff, and now by Mr. Crompton, illustrated the necessity of caution in drawing conclusions from curves which directly represented the results of observation.

Mr. Pickering characterized Mendeléeff's recent communications on density curves as containing a discovery of the highest importance. The acceptance of the hypothesis involved in his conclusions must depend on whether the breaks shown by the differential curves occurred at points exactly corresponding to hydrates of definite composition, and whether different physical properties of the same solution all exhibited breaks at the same points. Mr. Crompton's investigation afforded the first evidence that this latter confirmation was forthcoming. For some months past Mr. Pickering had been examining the curves representing the densities, specific heats and heat of dilution of salt solutions, and he felt confident that the results would confirm Mendeléeff's views and afford conclusive proof as to the chemical nature of dissolution. He intended also to further examine the heat of dilution of sulphuric acid, and from the heat of dilution he hoped to obtain more definite results than from the study of densities. As far as his present results went, he had obtained evidence in two or three cases of breaks at about $150H_2O$, as well as breaks at a much higher state of dilution. He did not, however, believe in the existence of compounds such as cryohydrates were assumed to be, and thought that such breaks might well be explained, as Dr. Armstrong suggested, on the view that water and liquids in general were made up of molecular aggregates.

Dr. Morley agreed with Professor Pickering that it was much better to make the curves tell their own story in the manner indicated by Mr. Crompton and Dr. Armstrong, than to divide them by the eye into arbitrary sections in the way which had hitherto been usual. He anticipated that the new method would lead to important results. At the same time he did not quite see at what point differentiation should stop : Mendeléeff had differentiated his curves once, Mr. Crompton had performed the operation a second time—why should it not be executed a third or a fourth time? It was obvious that the position of the maxima and minima was greatly changed after each differentiation, and therefore the system of straight lines which most nearly approximated to the curve would be different in each case. No doubt, if at any time the curve should exactly resolve itself into straight lines that would be a proper time to stop, but, if only on account of experimental errors, it was not likely that this would often happen. If we knew the law that governed the change of conductivity of a solution whose molecular constitution was not altered by dilution, the problem would be solved; thus if the curve expressing that law were a conic section we should differentiate once, if it be a cubic we must differentiate twice, and so on. For example, the same experimental curve might perhaps be represented, within the limits of experimental error, either by portions of five conic sections, by portions of three cubics, or by parts of two curves of the fourth degree ; which representation was to be chosen ?

Professor Ramsay agreed with Dr. Morley's remarks. He asked Mr. Crompton whether any physical meaning was to be attached to the second differential coefficient, or if it was merely found to fit the facts. Commenting on Dr. Armstrong's remarks, he asked to be informed what special views on electrolysis were held by Dr. Armstrong which could be supported by the proof of the existence of complex molecular aggregates. Dr. Armstrong had spoken of such molecular aggregates being urged past each other by the electric current ; but of this there would appear to be no proof, for as far as the speaker knew, there was no proof of the separation of such aggregates to opposite poles during the passage of a current. Moreover, granting Dr. Armstrong's assertion that such transference of molecular aggregates in opposite directions did occur, how is the fact of electrolysis to be explained by the friction of those travelling in opposite directions ? Did Dr. Armstrong imagine that the corners of such aggregates were rubbed off ?

Mr. Crompton, replying to Dr. Morley's objection that there did not seem to be any reason why a limit should be put to the differentiation when that operation had been performed twice, and that it would be just as reasonable to proceed with a third or fourth differentiation, and so on, said that a limit to the differentiation would necessarily have to be made according to the nature of the case under investigation and the discretion exercised by the investigator. In the present instance the limits of differentiation is clearly indicated by the agreement of the results obtained with those previously arrived at by Mendeléeff, by discussing a totally different physical property. There would obviously be nothing gained by a further differentiation, for supposing that operation to be again performed, it would give first a constant, and on repetition zero, or at most leave the errors due to experiment, and those which come in when performing the differentiation. In general it is easy to recognise when this stage is reached, provided that the errors are small—as in the experiments under discussion. In reply to Professor Ramsay he said that he could not give any physical meaning to the second differential coefficient.

Dr. Armstrong said that he could not now usefully reply to the questions put by Professor Ramsay, as to do so would involve a lengthy explanation of all that had previously been urged ; moreover his views had been fully stated in documents which were in the hands of the members of the British Association Electrolysis Committee.

Bismuth Iodide and Bismuth Fluoride. By B. S. Gott and M. M. Pattison Muir.—The preparation of bismuth iodide in the wet way, by addition of potassium iodide to a solution of bismuth nitrate, is described. The amounts of decomposition of specimens of bismuth iodide prepared in the wet and dry ways by heating with water are tabulated, and shown to be practically the same. The preparation of bismuth fluoride by adding potassium fluoride solution to a solution of bismuth nitrate, is described, and the properties of this salt are enumerated. The relative densities of BiI_3 BiF_3, and BiOF are given.

The Action of Hydrogen Sulphide on Arsenic Acid. By B. Brauner, Ph.D., and F. Tornicek.—When arsenic acid is treated with hydrogen sulphide, the precipitate consists either of arsenic pentasulphide or contains in addition arsenic trisulphide and sulphur. The authors find—(1) that when a *rapid* current of hydrogen sulphide is passed into a warm solution of arsenic acid containing chlorhydric acid, the pentasulphide is formed slowly, but completely: $2H_3AsO_4 + 5H_2S = As_2S_5 + 8H_2O$; (2) that in solutions of the acid, or when the gas is passed *slowly* into warm solutions of arsenates containing chlorhydric acid, a secondary reaction takes place together with the first chief reaction, but never alone, viz.:—

$$(a)\ H_3AsO_4 + H_2S = H_3AsO_3 + S + H_2O;$$
$$(b)\ 2H_3AsO_3 + 3H_2S = As_2S_3 + 6H_2O.$$

Note on the Constitution of Mairogallol. By C. S. S. Webster.

Reviews.

Exercises in Quantitative Chemical Analysis, with a Short Treatise on Gas Analysis. By W. Dittmar, LL.D., F.R.S.*

We have innumerable manuals of chemistry, but not many works on quantitative analysis, and none which covers quite the same ground as this book by Dr. Dittmar. It is not so much a compendium of analytical methods, as a course of laboratory instruction by means of a series of exercises and lessons. The first of these appropriately treats of the methods of weighing, a note being appended on the theory of the balance. As is well known, the balance is a hobby of Professor Dittmar's, and he is entitled to speak with authority on the subject. In his favourite modification of the instrument, the centre of gravity is lowered, so as to make the vibrations short and rapid. A micro-scale being attached to the needle, the vibrations are read by means of a microscope which has a hair placed in its focus. By this arrangement the operation of weighing is rendered more rapid, and at the same time more accurate.

The analytical methods described in the exercises are for the most part already familiar, except in so far as there are refinements and suggestive notes not usually met with. Indeed, the lessons generally are more interesting and less forbidding in aspect than the corresponding pages of some other books. Besides the analysis of alloys and metallic salts, we find such matters treated as the analysis of sea-water, determination of carbon in steel, quantitative electrolysis, the estimation of methyl alcohol in presence of ethyl alcohol, the analysis of milk, butter, soap and other organic mixtures. The methods are not selected on the principle of simplicity, but with the view of teaching as much as possible by each exercise. In that on the analysis of bleaching powder, Bunsen's, Penot's, Duflos' and Lunge's methods for determining the available chlorine are described, the preference being properly given to Penot's process. Referring to Bunsen's method, it is well remarked that "the imperfect stability of the thiosulphate is an inconvenience." This should be noted by those who use the volumetric solutions of the British Pharmacopœia. It is curious that Dr. Dittmar seems to suspect that chlorate as well as hypochlorite may react both in Penot's and Lunge's methods. One would think that point ought to have been determined before now. The various volumetric methods for the estimation of nitrates and nitrites are fully given, special honour being paid to the elegantly accurate, if also somewhat complicated, process of Kreusler. The subject of organic ultimate analysis is briefly dealt with, no doubt because it is so much a matter of practice and skill.

The section on Gas Analysis, Dr. Dittmar hopes, will be welcome to many, as there is no recognized treatise on the subject except Bunsen's 'Gasometrische Methoden,' which treats only of the great master's own methods. The author has devised certain improvements on the apparatus employed, the advantages of which may be best summarized in his own words:—"Bunsen's methods leave nothing to be desired on the score of elegance and potential precision, but they are very wasteful of time, and demand a special room for their execution. They, moreover, almost prohibit the use of gas flames as a means of artificial illumination, a serious drawback in a city like, for instance, Glasgow, where the sun does not shine *every* day." In Professor Dittmar's laboratory the students are taught to calibrate and graduate eudiometers and similar apparatus, the detailed description of which processes forms one of the Exercises.

Of the exercises in applied analysis the most interesting is that relating to mixtures of methyl and ethyl alcohols. Dittmar and Fawsitt found, after elaborate methods of purifications, that the specific gravity of methyl alcohol at 15° C. is ·7964, and the boiling point at 760 mm. pressure is 65° C. Riche and Bardy's method for the detection of methyl in the presence of ethyl alcohol was ascertained to be only satisfactory when the former amounts to about 2 per cent. or more, the higher alcohols forming a source of error. An improved process is described which renders practicable the detection of as little as ·25 per cent. Wanklyn and Chapman's method of limited oxidation was found to be untrustworthy. The old plan of oxidizing the methyl alcohol to formic acid, and testing for the latter with silver nitrate gave useful results, care being taken to get rid of all the aldehyde by evaporation of the neutralized solution.

The book is clearly printed, and has been carefully corrected. It is one which no teacher of chemistry should be without, and which every student will be the richer by possessing.

Bench Book for Test-Tube Work in Chemistry. By H. T. Lilley, M.A.*

This little pamphlet, consisting of about a dozen pages, and published at one shilling, is intended as a bench companion to the student in qualitative analysis. It consists merely of the ordinary analytical tables for the analysis of simple and mixed substances, with a few preliminary hints on the solubility, appearance, etc., of ordinary salts, and on the method of proceeding with an analysis. The directions for applying some of the tests are rather lax, *e.g.*, "silicate, add HCl: a gelatinous precipitate of silicic acid;" unless the solution was pretty concentrated the student would probably get no precipitate in this way, especially if he added large excess of HCl, which he very probably would do.

The preliminary or "dry" tests, which frequently receive less attention than they deserve, considering the ease of their application, and the quick results they give, will probably be found useful by many students who are more familiar with the ordinary "wet" methods.

BOOKS RECEIVED.

Foods: their Composition and Analysis. By Alexander Winter Blyth, M.R.C.S., F.C.S. Third Edition. London: C. Griffin and Co. 1888. From the Publishers.

On the Use of Certain Plants as Alexipharmics or Snakebite Antidotes. By Daniel Morris, M.A., F.L.S. From the Author.

* Glasgow: William Hodge and Co. 1887. Large 8vo. Pp. i.-xii., 1-318. 10*s.* 6*d.*

* London: Hamilton, Adams and Co.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Additional Observations on a Mixture of Saccharin and Borax.

In reading through Mr. Naylor's further notes on saccharin, appearing in the *Pharmaceutical Journal* of November 26, it would appear to the casual observer, who had not read the previous correspondence, that he was bent upon justifying my original statement that boracic acid is liberated by the action of saccharin on borax, rather than attempting to substantiate his emphatic denial that such was the case, so complete are the results of his recent experiments in support of my statement. The point at issue between Mr. Naylor and myself is really whether boracic acid is liberated or not by the action of saccharin on borax, as the following extracts will show:—"Notes on Saccharin," by E. D. Gravill, *Pharmaceutical Journal*, October 22, p. 337: "Like glycerine, it liberates boracic acid from borax." "Notes on Saccharin," by W. A. H. Naylor, *Pharmaceutical Journal*, November 5, p. 377: "It failed to liberate boracic acid from a solution of borax, either in the cold or on boiling or after being kept over a water-bath for four hours." And further proceeds to emphasize this fact. If Mr. Naylor was so satisfied with his previous results in this respect, it appears difficult to reconcile the following statement extracted from his further notes on saccharin appearing in the *Pharmaceutical Journal* of November 26, p. 437. In addition to giving an equation to illustrate the liberation of boracic acid he also says:—"My next inquiry was an attempt to determine if it were necessary that either the borax or the saccharin should be in excess in order to produce the reaction ascribed to boric acid. Two solutions were made, each containing both these substances, in one of which borax predominated, and in the other saccharin. Both of them were found to give the green tinged flame accepted as evidence of boric acid."

I find no statement to show to what Mr. Naylor ascribes his former failure to obtain this result, and although he so distinctly says it is unnecessary to add an excess of saccharin in order to obtain free boracic acid, I notice he is careful to act upon my suggestion (*Pharm. Journ.*, Nov. 12, p. 416), to add it in excess, *i.e.*, to produce a distinct acidity to the solution before applying his experiments. I am quite in accord with Mr. Naylor with regard to his explanation of the final decomposition between saccharin and borax, as it exactly justifies my original statement; but I find that by operating on 1 gram of borax (Howard's) in 256 c.c. of water, it will allow of the addition of 0·50 gram of saccharin without showing the slightest sign of acidity; and having repeated his experiments on this solution, in which an excess of saccharin was carefully avoided, I failed to obtain evidence of free boracic acid, and only very minute traces of benzoic acid were extracted with ether, while a portion of the same solution, rendered distinctly acid by the addition of an excess of saccharin, gave abundant evidence of boracic acid, and yielded in comparison a large quantity of benzoic acid to ether. I am therefore still of opinion that saccharin must be added in sufficient quantity to give a distinct acidity, in order to show the liberation of boracic acid satisfactorily. A repetition of Mr. Naylor's experiments was made on a cold and boiling solution of borax, and also after keeping over a water bath for some time, so that I feel convinced that, had he not been careful to have a distinctly acid solution on which to try his experiments his results might not have been so complete in illustrating that my original statement was right and his own wrong, and might possibly have thrown some light on his previous failure.

I notice that Mr. Naylor also in his later notes compares results obtained with saccharin and with benzoic acid, in which the solubility of these substances in water, alcohol, ether, chloroform and benzol are stated to be practically the same. My experience has been to find that there is such a wide difference between the solubility of these two acids in the majority of liquids named, as to form a very important distinction between them, viz:—

Benzoic acid.	Saccharin.
Alcohol about 1 in 3.	About 1 in 23.
Ether about 1 in 3.	About 1 in 100.
Chloroform about 1 in 7.	About 1 in 500.
Benzol very soluble.	About 1 in 250.

The solubility of saccharin is probably influenced to a slight extent by the presence of a greater or less percentage of foreign matters, but not sufficiently to account for the wide difference in solubility between that substance and benzoic acid.

Edward D. Gravill.

Pil. Rhei Co.

Sir,—I beg to take exception to one remark of "One of the Craft" on the B.P. form for Pil. Rhei Co. in his letter in the Journal of December 3, when he says that the excipient ordered is far too large, and that half would be sufficient.

Now I have made the mass strictly according to the B.P. ever since it was published, and consider it makes a splendid mass in every way; it may be a little soft at first, but in the course of a day or two it does well, and the pills keep their shape.

I think if chemists, as a whole, would strictly follow the B.P. in making their preparations, we should have very much less fault-finding on the part of customers that medicines vary in colour, flavour and action.

I love to see a well-made pill, and may add that I always mix the powders with the oil, then weigh out on some strong paper 4 ozs. of the powder, make a sort of reservoir in this, and finely weigh the glycerine and treacle.

Southwell. J. H. Downing.

The Unofficial Formulary.

Sir,—In your last issue (pp. 469–470) you publish a paper by Mr. F. McDiarmid, in which he refers to tinct. bryonia of the Unofficial Formulary, and remarks that the moisture of the root does not seem to mix with the s.v.r. to any extent, as after maceration and expression a considerable quantity of s.v.t. had to be added to make the tincture of the right strength.

Although I have prepared a considerable quantity of this tincture at various times by percolation, instead of maceration, I have never found any exception to the rapid combination of the s.v.r. with the water of the fresh root.

Mr. McDiarmid appears to have committed an error in making his tincture, he having added the s.v.t. after maceration and expression instead of before.

The object sought is the maceration of the root in proof spirit; and the addition of a suitable quantity of s.v.r. to the water in the fresh root causes the formation of a certain amount of this strength of spirit; this, however, is to be supplemented by a further addition in order to secure complete exhaustion of the magma.

When prepared in the manner indicated in the "Formulary," with the substitution of percolation for maceration, the exhaustion of the root is so perfect that the pressed marc is quite tasteless, while the tincture is intensely bitter.

59, *Moorgate Street, E.C.* John M. Wyborn, F.C.S.

Syrup. Ferri Phosphatis.

Sir,—Although the increased amount of acid in this preparation was noticed by Mr. Conroy, vol. xvi., p. 379; yet I think the matter has hardly received the attention which it deserves.

Mr. Martindale in his widely popular 'Extra Pharmacopœia,' 4th ed., states that the B.P. process may be simplified as follows:—"Iron wire, polished, 360 grains; syrupy phosphoric acid, s.g., 1·500, 9½ ounces, etc., etc." the finished syrup measuring 96 ounces or eight times the Pharmacopœia quantity.

Any indication that the syrup so made will differ in acidity from that made by the B.P. process is altogether wanting. Yet the difference is considerable. Eight times the 1¼ fl. oz. ordered would be 10 fl. oz., and the quantity of acid necessary to combine with 360 grains Fe to form $Fe_3(PO_4)_2$ is 11·6 fluid drachms, or very nearly another ounce and a half.

So that Mr. Martindale's formula requires the substitution of 11½ for 9½ ounces to ensure the full Pharmacopœia strength in acid of the syrup so made. It may be that the ferrous phosphate can be held in solution by a less amount of free acid than seven times that which exists in combination, and the resulting syrup would no doubt be more palatable; but is it right to depart from the Pharmacopœia standard?

Market Square, Dover. J. F. Brown.

An Incompatible Mixture.

Sir,—Some years ago I dispensed a prescription similar to those mentioned in your last issue; the following is a copy:—

℞ Potassæ chloratis	ʒii.
Syr. ferri iodidi	ʒvi.
Vini antim. tart.	ʒss.
Æther. chloric	ʒj.
Aquam ad	℥viii.

The mixture gave evidence of free iodine within half an hour. I found on investigation that a sufficiency of chlorate liberated the whole of the iodine from the syrup; excess of chlorate and increase of temperature hastening the process. Further details of the reaction are recorded in the *Pharmaceutical Journal*, [3], x., p. 850.

As it is most probable that the prescriber would be unaware of the reaction, it should, if possible, be brought under his notice before dispensing such a combination.

35, *Clifton Road, Maida Vale, W.* R. H. Parker.

Sir,—Some three or four years ago I had to dispense a prescription containing pot. chlor. and syr. ferri iod., and I found that the addition of pot. cit. entirely prevented the development of free iodine. J. B.

Early Botanical Authors.

Sir,—I am surprised that Mr. Elborne, in his address on botany at Manchester, should have made no reference to William Turner, M.A., M.D., Dean of Wells, who published his 'Libellus de re Herbaria Novus' in 1538, 'The Names of Herbes' in 1548, the first part of his 'New Herball, wherin are conteyned the names of Herbes in Greke, Latin, Englysh, Duch, Frenche, and in the Potecaries Latin,' in 1551, and the completing part in 1562. John Falconer, Doctors Clement, Wendy, Owen and Wotton, had also collected herbaria, or published 'Bokes of Simples,' and the 'Grete Herball' of 1526 contained figures of plants, which were the first engravings of the kind.

The merit of Turner lay (as he says in his preface, 1551) in his "sekyng of herbes and markyng in what places they do grow." After speaking of his predecessors, he says "yet hath none of al these put forth anythyng, ether to the generall profit of hole Christendome in latin, and to the honor of thys realme, nether in Englyshe to the proper profit of their naturall countre." Some of Turner's works are adorned with excellent cuts. He wrote on almost every subject in Natural History, and from his garden in Cologne, or Wells, he sent plants to the London Potecaries for trial and use.

Much praise is due to Mr. Daydon Jackson, of the Linnean Society, for his care for the memory of Dr. Turner, whose name should never be omitted in ever so cursory a sketch of the "Fathers of English Botany."

Shepton Mallet. Fredk. Porter Smith.

A Chemist's Apprentices' View of the Future of Pharmacy.

Sir,—I am, as you will see by my signature, one of the many thousands who during the past few years have embarked on the sea of life, choosing pharmacy as their vessel.

I had hopes of once becoming a respected member of society and the profession (for such it surely is) I had adopted, but after three years' experience I find what a complete farce a chemist's profession is, and is likely to be.

I am employed at what was once a flourishing first class business in a western suburb of London, whose returns have yearly fallen off, not through inattention to business, or opposition of brother chemists, or decrease of population, but through what has now become the bug-bear of all chemists, great or small, London or provincial, *i.e.*, the selling of almost all our drugs and articles by drapers, grocers, universal providers, and goodness only knows whom else, who not only have no practical knowledge of the goods they sell, but sell them at such prices that for chemists to compete is out of the question. Now, what prospect has a beginner like I am before him? Certainly the prospect of much expense and many months of hard work to enable him to pass the Minor examination and then to start on a level with those traders I have mentioned. An ample recompense, surely! But as a pharmacist, what chance has he?

We have a Society to protect us, or at least is supposed to look after our interests, at the head of which are gentlemen who have no care for the future of pharmacy, but to raise the chemist from a business man to a professional gentleman, to whom the sale of a "pennyworth of salts," or "anti-bilious pills," etc., would be quite *infra dig.* Their intention is most honourable, I admit. But that is not the sort of thing that is wanted. What really should be done is to obtain the rightful government protection belonging to such a respectable hardworking class of citizens as chemists. Then there might be some chance of earning bread and cheese, which is more than can be said at present.

Surely it is time something was done. Correspondence should be invited, and meetings held amongst chemists at the instigation of the Pharmaceutical Society, to try and remedy the present most deplorable state of affairs. As to chemists who will so disgrace themselves and their profession as to undersell each other, or do a "cutting business," as they call it, they are beneath my, or any chemist's notice, I should think.

London. A Disgusted Chemist's Apprentice.

W. Duplock.—The reaction has not yet been made out with sufficient certainty to allow of it being represented by an equation. For a probable suggestion, See *Pharm. Journ.*, [3], x., 851.

Erratum.—Mr. A. C. Abraham asks to be allowed to correct an error which has crept into the report published last week (p. 464), of the proceedings of the Liverpool Chemists' Association; which, by the way, it may be stated, was the official report supplied by the Association. Mr. Abraham says that he "never mentioned india rubber in connection with the subject of chewing-gum, and of course did not make a statement so contrary to fact as that imputed" to him.

Extract of Soap.—A. W. F. asks for information as to the composition of washing powders supplied as "extract of soap" and under similar names.

Winnipeg.—The failure was probably due to the spirit used being too weak, if it contained only 60 per cent. of alcohol.

W. A. J.—The strength of the preparation you suggest would be largely influenced by the solubility of cantharidin in the menstruum used. That appears to be a point yet to be determined, as we have been unable to find any precise data respecting it.

Communications, Letters, etc., have been received from Messrs. Claridge, Hooper, Humphrey, Downing, Young, Inquirer, Apprentice.

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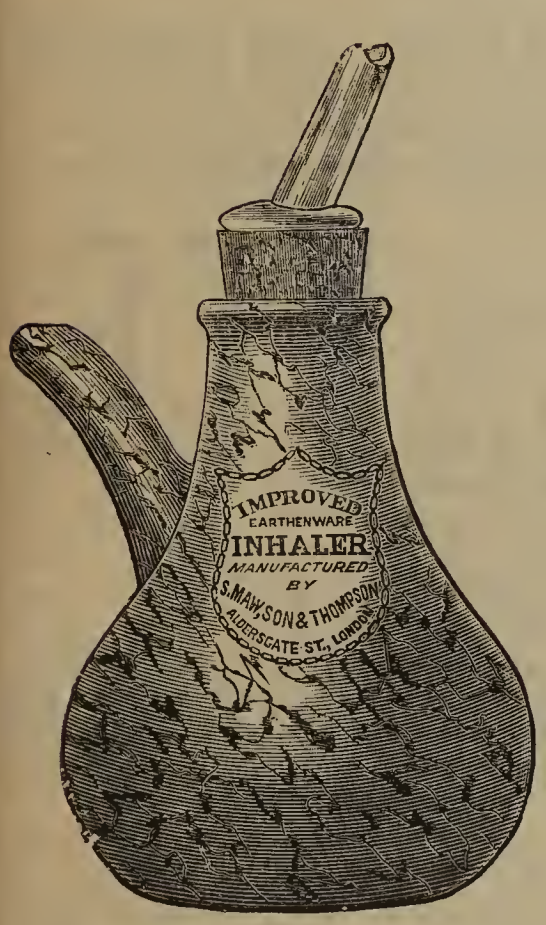

Fig. 8.

MAW'S IMPROVED.

Fig. 6.

MAW'S DOUBLE-VALVED.

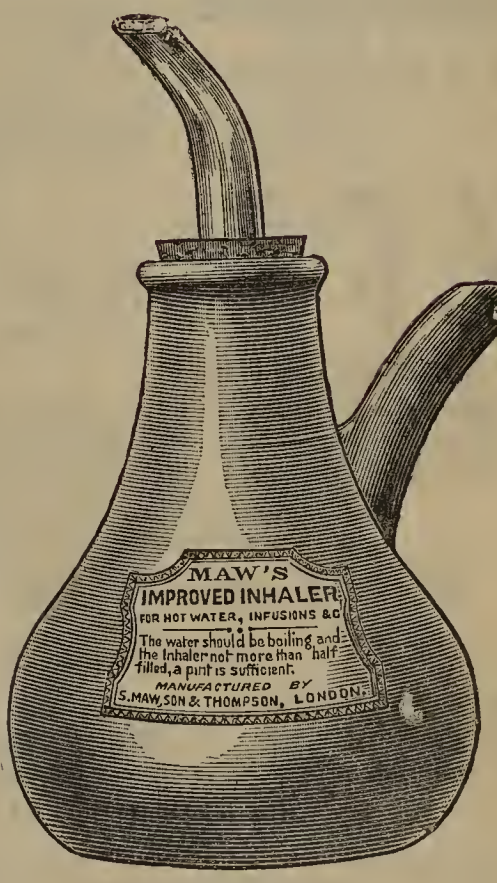

Fig. 8a.

MAW'S IMPROVED.

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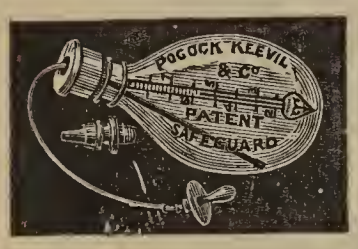

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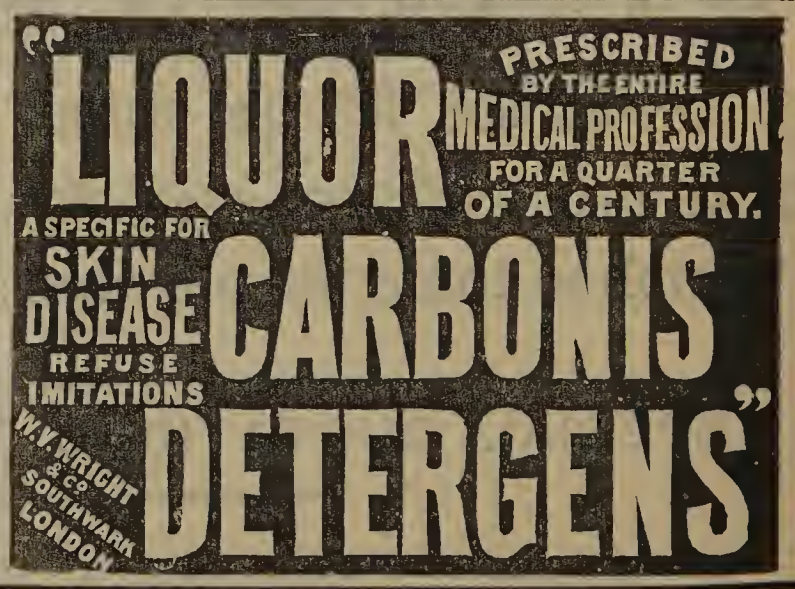

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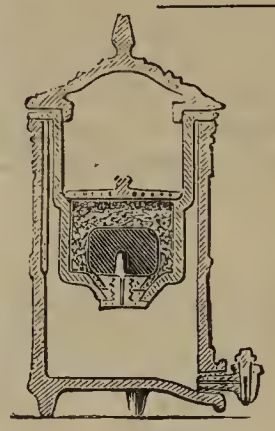

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 912.] SATURDAY, DECEMBER 17, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

CHRISTMAS VACATION.

The Library and Museum in London will be closed from 5 p.m. on Friday, December 23rd, until 9 a.m. on Wednesday, December 28th, and will not be open in the Evening from Wednesday, December 28th, to Monday, January 2nd, both dates inclusive.

The Society's House in Edinburgh will be closed on Monday, December 26th, and also on New Year's Day. It will not be open in the Evening from Tuesday, December 27th, to Friday, December 30th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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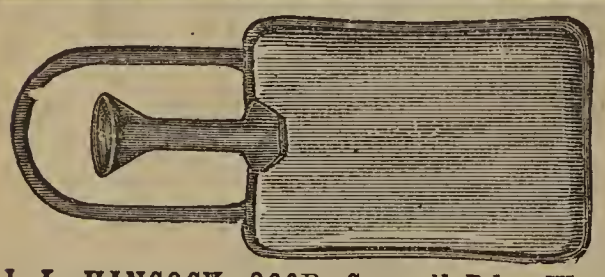

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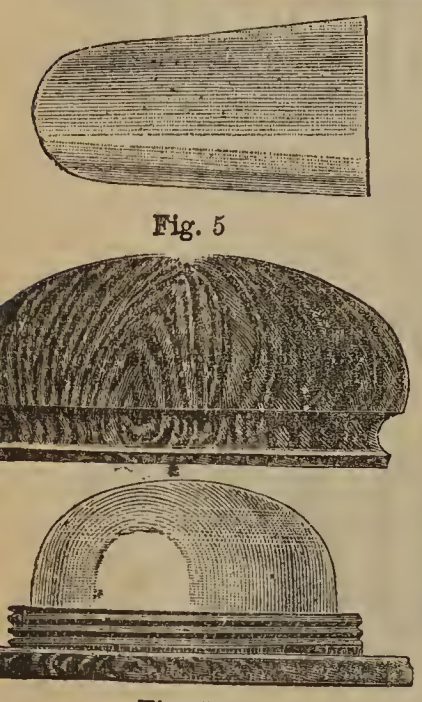


Fig. 3.

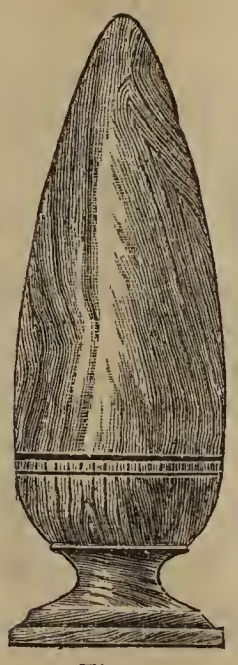
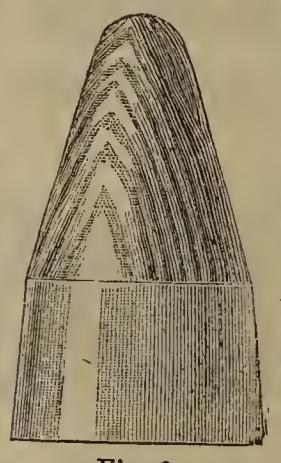


Fig. 4.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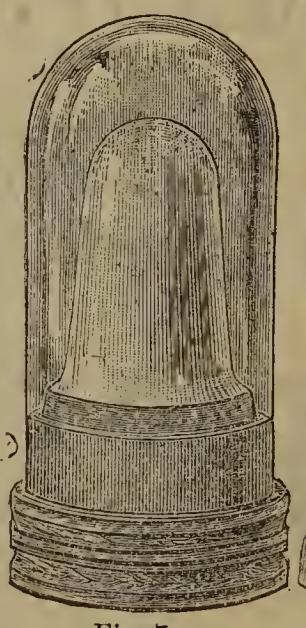
Fig. 7.

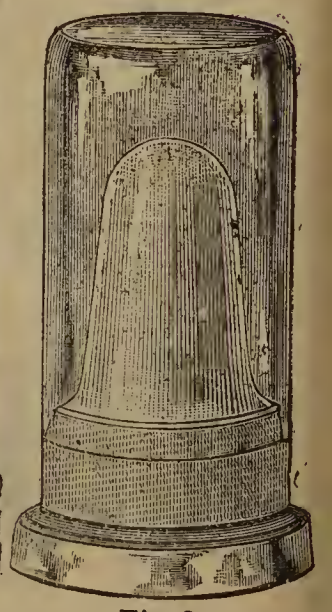
Fig. 8.

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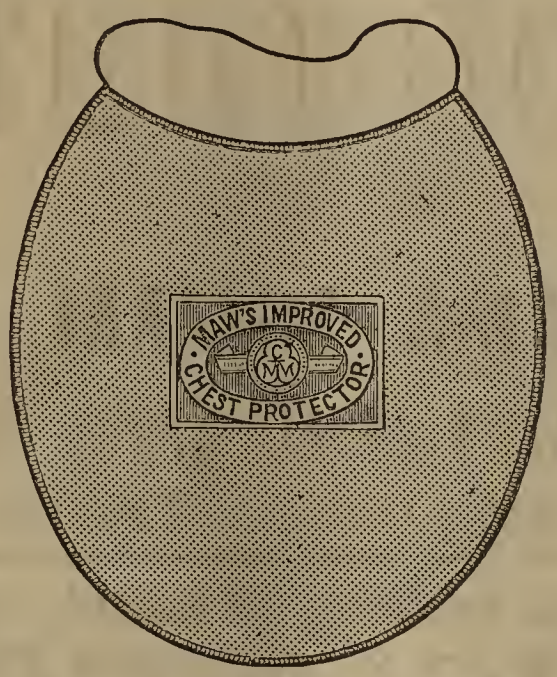

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Fig. 5. Vests „	„	27/	34/	42/	51/

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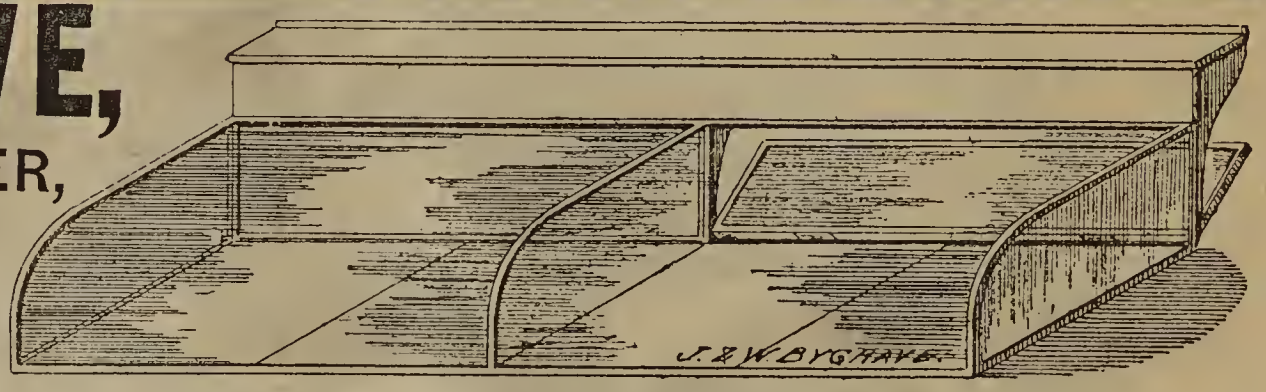

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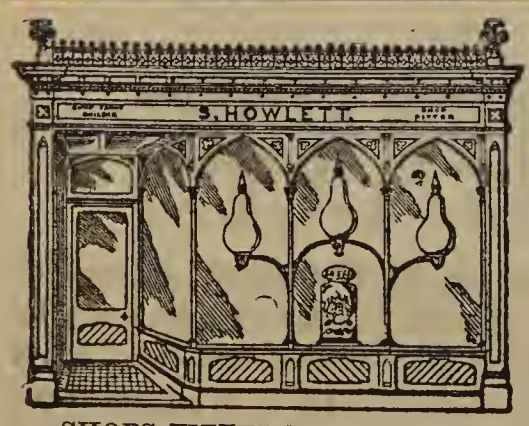

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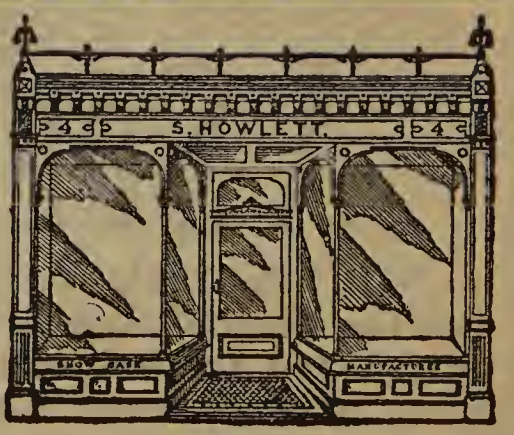

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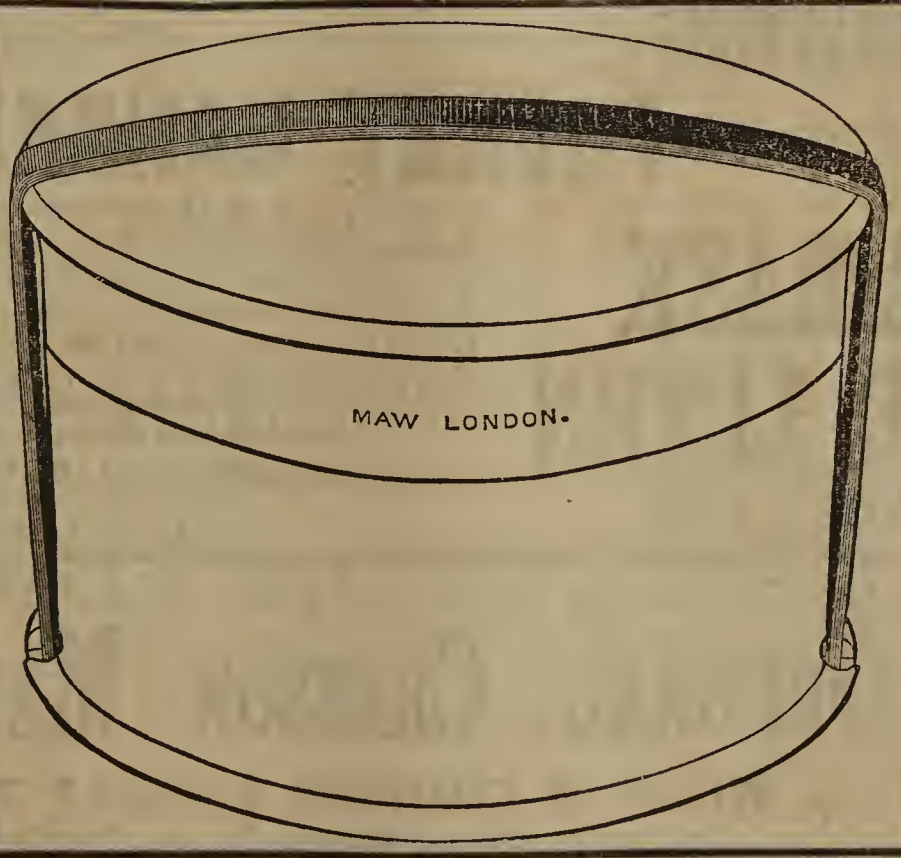

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THE ALLEGED FUNDAMENTAL ERRORS IN THE BRITISH PHARMACOPŒIA.*

BY PROFESSOR REDWOOD.

Professor Tichborne, in a paper read at a recent meeting of the British Pharmaceutical Conference, represents as fundamental errors the system of weights and measures, specific gravities, and volumetric estimations of the British Pharmacopœia. He says, "I am dealing with actual mistakes. There are errors and calculations in connection with the weights, however, which permeate the whole of the Pharmacopœia." . . . . . "The errors produced are not large, but unfortunately they pervade every calculation in the book."

Such in general terms is the accusation made, which it must be admitted is broad and positive enough. It is followed by some specific allegations of errors in the represented strength of medicines, including hydrocyanic acid. But before entering upon the consideration of how far those allegations are substantiated, I wish to dispose of two statements of a more general character, relating to subjects a mistaken apprehension of which appears to have largely contributed to the conclusions arrived at by the author. They are as follows:—

1. The author says, "such statements as 'the grain measure' at 60° 'being the volume of a grain of distilled water,' is superfluously untrue."

2. After referring to the use of metric measures at 60° F., he says, "Thus it will be seen that the Pharmacopœia works and makes all measurements at 60°, whilst the imperial measures are graduated at 62° F., and the metric measures should be graduated at 39·2° F."

Now from both these statements it would appear that the author does not consider it necessary to interpret the meaning of terms used in the immediate text by reference to the context.

The expression "the grain measure being the volume of a grain of distilled water," is only used in connection with a full and explicit description of that measure which immediately follows, and in which it is required to be estimated at 60° F. This measure forms no part of the system of imperial weights and measures. It is a convenient integer, well suited for use in volumetric estimations, for which purpose it was introduced into the British Pharmacopœia of 1867. The term had previously been used as applied to a volumetric measure, and the instruments representing it, in common with other similar instruments, were commonly graduated at 60° F. There was, therefore, on this and other accounts, good ground for adhering to that temperature. I admit that the sentence quoted by the author would be improved by the addition of "at 60° F.," but I deny that in its present form it could be mistaken by anyone, or that it is a source of any error.

The statement that "the Pharmacopœia works and makes all measurements at 60°, whilst the imperial measures are graduated at 62° F.," implies that the Pharmacopœia directs imperial measures to be used at 60° F. It is on this assumption that most of the author's calculations are made, in which he represents the indications of the strength of medicines as given in the Pharmacopœia to be erroneous. It is important therefore to ascertain whether anything in the Pharmacopœia justifies that assumption.

With reference to this question I say that not only does the Pharmacopœia not direct imperial measures to be used at 60° F., but that all that is therein stated, bearing upon that point, is opposed to such a construction. The preface, pp. xvi. and xvii., says, "no alteration has been made in the weights and measures which in the edition of 1864 were directed to be used in the preparation of medicines." And again, "In the measurement of liquids the imperial measure is used for the higher denominations, and the fluid ounce and its subdivisions into fluid drachms and minims for the lower denominations of volume. These measures are convenient and have become familiar, having been used throughout the United Kingdom for many years." I ask, is there anything here to indicate that imperial measures had been altered, and that in future they were to be used at 60° F., instead of the legal standard temperature of 62° F.? I need hardly state that there was nothing in the edition of 1864 to justify such a change, the effect of which would be, as Dr. Tichborne has shown, on the authority of Mr. Chaney supported by his own calculations, that the imperial gallon would contain 70,011 grains of water instead of the 70,000 grains, as represented at p. 498 of the Pharmacopœia itself. Again, in the preface, p. xix., occurs the statement "Temperature in all cases, excepting where otherwise stated, is to be determined by Fahrenheit's thermometer, and specific gravities are to be taken at 60°." Now surely, if it was intended that imperial measures should be used at 60° F., there would have been an intimation to that effect here. The absence of such intimation, and the terms in which reference is made at p. xvii., to the fact that the measures indicated "have become familiar, having been used throughout the United Kingdom for many years," together with the note at page 500, stating that the grain is standard at 62° F., conclusively proves, in the absence of any evidence to the contrary, that no alteration was intended to be made in the usual mode of using them, as specified by law.

How then, it will be asked, has Dr. Tichborne arrived at the conclusion that the Pharmacopœia directs imperial measures to be used at 60° F.? The only ground I can discover for such an assumption, is based on a sentence contained in an appendix to the Pharmacopœia which relates exclusively to the methods of producing and using test solutions for volumetric estimations.

The last paragraph of what may be called the introductory chapter to this special appendix to the work is as follows:—"Volumetric solutions, before being used, should be shaken, in order that they may be throughout of uniform strength. They should also be preserved in stoppered bottles. All measurements should be made at 60° F. (15·5° C.)."

It is worthy of notice here, that throughout the whole of this special appendix, relating to "test solutions for volumetric estimations," there is no mention of, or reference to, any imperial measure of capacity, the only British measure of capacity noticed being the grain-measure as adopted and specified for use in the British Pharmacopœia.

Now, considering the special character of the whole of the matter in the appendix from which the foregoing quotation is made—considering that there is no reference to any imperial measure of capacity

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, December 14.

throughout the whole of that appendix, while measuring with the grain-measure, or its metric substitute, forms the substance and object of whatever is there stated—considering, moreover, the evidence I have already adduced in proof of the fact that the Pharmacopœia directs standard and legal imperial measures to be used—if Dr. Tichborne still persists in stating that the Pharmacopœia directs imperial measures to be used at 60° F., I can only say that he must have a method of interpretation peculiarly his own.

I may further add, that while imperial standard weights and measures are directed to be used "in the preparation of medicines," and also in prescribing and dispensing medicines, imperial measures of capacity are nowhere, in the Pharmacopœia, applied in cases where great accuracy is required. Their units and subdivisions are not suited for employment in analytical operations, and the instruments supplied for their adjustment, do not afford means for the attainment of great accuracy. Therefore, in such cases, the quantities operated upon are taken by weight, the equivalent volume being stated in parenthesis. The measures, as well as weights, are periodically tested by officers specially appointed for that purpose. They are standard at 62° F., and are assumed to be used at that temperature, but in ordinary cases it is not customary to pay particular attention to the temperature, nor would it be possible by doing so to ensure great accuracy if the instruments for measuring be such as are commonly employed. Moreover, the temperature of 62° F. is so near that at which measurements of medicines are in most cases made, that such slight discrepancies as may occur are not important.

The conditions affecting the use of metric measures are in some respects different from those just referred to in connection with imperial measures. Thus, for instance, metric measures are, strictly, standard at 4° C., but this temperature is unsuited for taking measurements in delicate operations, such as those of volumetric analysis, and therefore the instruments used in processes of that description are always graduated at 15·5° C. (60° F.), at which temperature, of course, they are used. Dr. Tichborne almost admits this to be the case, for speaking of metric measures he says, "the volumetric instruments in this country seem to be generally" (he might have said always) "graduated at a temperature of 60° F.," and he proves this by experimental determinations. He might have gone further and included continental countries, such as France and Germany, where, as far as I can ascertain, the same practice is adopted. Yet the measures thus graduated are always and only known by their standard names, as litres and cubic centimetres.

But whether the instruments be graduated at 4° or at 15·5° C., as they practically are, the results of using either one or the other as directed in the Pharmacopœia, would be precisely the same. The quantity of water in the solution is immaterial. The essential active agent is not a measured but a weighed quantity, which is dissolved in water and introduced into a glass tube divided into 1000 or 100 equal parts. The use of this instrument (burette) is merely to afford the means of dividing the active agent while in solution into a certain number of equal parts.

I have thus disposed of this part of the subject, having explained why the special pharmacopœial grain measure is made the volume of a grain of water at 60° and not 62° F., and having, as I trust, conclusively proved that nothing in the Pharmacopœia tends in the slightest degree to authorize any alteration in the standard temperature of imperial measures.

I will now proceed to consider the cases in which specific errors in the estimated strength of medicines are alleged to result from prescribed but defective methods of estimation.

The first specific case to which allusion is made is that of diluted sulphuric acid. In this case the author says "we are directed to take 6 drachms (the division of the 70,000 grained gallon) and estimate it by a volumetric solution made according to my calculations theoretically per 70,011 grains per gallon. We are therefore working under such conditions that we could only obtain correct results by taking and measuring the substance to be estimated at 62° F., and by using and maintaining the temperature of the volumetric solution at 60° F.—a condition of things not indicated in the directions of the Pharmacopœia," etc.

In answer to this I say, first, that if we could take the substance to be estimated by measure, means being provided, which, however, we do not possess, for measuring 6 fluid drachms with rigid exactness, the conditions under which we are directed, although partly by inference, to work, would be precisely those which the author says are essential for obtaining a correct result. The 6 fluid drachms would have to be measured at 62° F., that being the standard temperature of imperial measures, and nothing appearing in the Pharmacopœia to the contrary.

But further, I say that as there are no means available for the users of the Pharmacopœia, by which they can, with the accuracy required, measure 6 fluid drachms, they are pointedly told to take 359 grains by weight. The term 6 fluid drachms is inserted in parenthesis for the mere purpose of indicating to those who are accustomed to use the acid by measure what the volume is of the 359 grains.

And now, having arrived at a means by which we can separate and take an exact quantity to work upon, which 6 fluid drachms by measure would not be, but which 359 grains by weight may without difficulty be ensured to be, this constitutes the first essential condition for the attainment of an accurate determination in the case under notice.

But there are other conditions equally necessary. The second is that the volumetric solution of soda required for the neutralization of the acid shall contain exactly 40 grains of hydrate of sodium. It is provided by the Pharmacopœia that a quantity of the solution there described, having a volume equal to that of 1000 grains of distilled water at 60° F., shall have the required alkalinity. That condition is therefore provided for.

There is now one more requisite, which is that we should have and use in the operation a graduated glass tube (burette) the capacity of which is accurately divided into equal parts, 100 of which parts shall contain the 40 grains of hydrate of sodium. It is convenient, and consistent with other requirements that these 100 parts should correspond to the volume of 1000 grains of distilled water at 60° F., but the accuracy of the estimation would not be in the slightest degree affected if the tube were graduated at a higher or a lower temperature, provided

that the 100 parts marked on it contained the 40 grains of hydrate of sodium, and that the measurements were made at such altered temperature. The Pharmacopœia directs that a graduated glass tube (burette) should be used which when filled to 0 holds 1000 grains of distilled water at 60° F., and is divided into 100 equal parts. This fulfils the requirements of the third essential condition.

We thus have all the conditions fulfilled that are required for the attainment of an accurate determination, and I need say nothing more in proof of the obvious fact that the process of the Pharmacopœia in this and all similar cases in which the foregoing conditions are fulfilled, yield perfectly reliable and accurate results, and that the statement of Dr. Tichborne to the contrary is entirely devoid of truth.

It might, however, be said that in taking, as I have done, the first specific case alluded to by the author, I have not yet touched upon what is represented as the most serious case. He says, "the most striking point of all is that we have in the Pharmacopœia still further complicated matters by the adoption and use of the true metric standard, but with an intimation at the same time that we must measure and work with it at 60° F." After referring to the volumetric solution of oxalic acid and stating that it yields incorrect indications—which I have already, by implication, sufficiently dealt with—he comes to the really serious charge affecting the estimation of the strength of hydrocyanic acid, and states, that in estimating this acid with metric apparatus as directed in the Pharmacopœia the result will be erroneous to the extent of 77·7 grains of real acid in a gallon of the official acid.

The author's statements in this part of his paper are not explicit—in fact they are very obscure and confused—but as far as I can comprehend his meaning it is, that in carrying out the processes of the Pharmacopœia the operator is supposed to use two different sets of metric instruments, or to work under two distinct sets of conditions. Thus he is supposed to make volumetric solutions with metric instruments graduated at 4° C., but used for this purpose at 60° F., and afterwards he is supposed to employ the same solutions for testing with similar instruments but used at 4° C. If this is not his meaning I do not know what he means. If it be his meaning I can only say that he has failed to substantiate the charge of absurd inconsistence which would be thereby implied.

The Pharmacopœia describes the metric instruments to be used, applying to them the names used by all scientific men, these names being alike applied to the measures, whether they have been graduated at the normal or theoretical temperature of 4° C., or at the substituted and only practically available temperature of 15·5° C. The former of these are not met with in commerce, although of course such could be produced if required for any special purpose, whereas the latter are used in every scientific laboratory. It does not signify which of these is used, provided all the conditions be fulfilled, as already stated. Either would yield perfectly accurate results ; but it must be one or the other, and not partly one and partly the other ; nor is there anything in the Pharmocopœia to justify the latter proceeding.

Now, referring to what I have already said respecting the estimation of diluted sulphuric acid, it will be obvious that what I have there said is equally applicable to the case under notice of hydrocyanic acid, and that if the 100 c.c. tube (whether graduated at 4° or at 15·5° C.) contains 1·7 gram of nitrate of silver, as directed, the indication afforded will be correct.

I have now disposed of all the charges that are sufficiently defined to be intelligible, and do not consider it necessary to allude to those that are merely hinted at. The whole has been ingeniously wrapped up and mystified, and I am not surprised that it failed to draw forth a fitting discussion at the meeting at which the paper was read. But seeing that the imputations upon the Pharmacopœia are of a very serious nature, and that time has now been allowed for considering them, there are two things that have surprised me. The first is, that the statements made have received no public notice from pharmacists, whom they so intimately affect ; and the second is, that the averment respecting the use of pharmaceutical measures at 60° F. should have received not only a public but an official notice, which might be construed into an indorsement by the Board of Trade. In a supplement to their last report on their proceedings and business under the Weights and Measures Act, 1878, the superintendent of weights and measures makes the following statement under the head of "pharmaceutical units." He says, "notice has been called by Dr. Charles Tichborne, of Dublin, to the fact that the normal temperature, 60° F., to which pharmaceutical measures and weights are referred, differed from the original legal temperature, 62° F., on which the imperial standards are based." This statement is not very explicit, but if we may interpret it by referring to Dr. Tichborne's paper, it greatly surprises me that what amounts to an official imputation on the Pharmacopœia, should have been apparently made on such insufficient grounds.

Dr. Tichborne's paper, and the discussion upon it, came to my notice somewhat tardily during a period devoted to recreation, and the subject was practically dismissed by me in the hope that it would be dealt with by some one who would save me the disagreeable duty of discussing questions which involve some personal allusions. But it has since been pointed out to me that the system of volumetric testing was constructed and other matters complained of were introduced by me in 1867, and that it was therefore fitting that I should reply to the accusations now made.

The subject is one to which I have, in past years devoted a good deal of attention, and I certainly felt that I had with some success encountered what at first seemed a somewhat difficult problem.

For many years previously it had become the established practice among scientific men, to take and record specific gravities and volumetric estimations at 60° F., and the instruments used for such determinations were graduated at that temperature. Moreover, in connection with these and other operations, the use of metric weights and measures was rapidly superseding those of the British system among the class of scientists ; and it was frequently suggested that a similar change might be advantageously made in pharmacy. But although the time had not arrived for making this change in general pharmaceutical operations, it was thought desirable that pharmacists should become acquainted with the metric system, and be encouraged to use it

in analytical operations. It was a natural suggestion, therefore, that such use should be promoted by simplifying, as far as possible, the transition from one system to the other; also that pharmaceutical estimations of strength and specific gravity should be made to coincide with those of other scientists, and that the confusion and error that would be likely to arise from the instruments used in such estimations being sometimes graduated at one temperature and sometimes at another, should be, as far as possible, avoided.

Now, I submit that these several objects have been attained by the methods adopted in the Pharmacopœia of 1867, and which, after twenty years of unopposed and successful use, are retained in the last edition of that work, and I emphatically deny that there is any ground whatever for the charges now alleged against them.

[*The discussion on this paper is printed on p.* 502.]

NOTE ON THE PRESENCE OF TANNIN IN GENTIAN ROOT.

BY C. J. S. THOMPSON.

The presence or absence of tannin in the root of *Gentiana lutea* has long been a question of dispute, and from the evidence brought forward from both sides no absolute decision seems yet to have been arrived at.

According to Hanbury the root owes its bitter taste to gentiopicrin, a neutral body, soluble in water: it also contains gentianin or gentisin, a colouring principle, and a large quantity of pectin, the presence of tannin being left open to doubt. The investigations of Maisch went to prove that tannic matters were absent from the root, his belief being based on the following experiments:—

1. A cold aqueous infusion was not disturbed by gelatine solution until it had stood for some hours, when a scant light coloured precipitate made its appearance; this, after washing, was merely tinged light brown by dilute ferric solution.

2. The infusion gave dark reddish-brown colour with ferric chloride, but no precipitate on standing.

3. A tincture prepared from the root which had previously been nearly exhausted with water gave a deep brown-green colour with ferric chloride, and if sufficiently concentrated a precipitate also resulted. He referred the colour reactions produced with ferric chloride to its action on gentianic or gentisic acid, and concluded that tannin was absent from the root in any form.

On the other hand, Ville, after carefully conducting a series of experiments on the subject, states he found unmistakable indications of tannin in the root of *Gentiana lutea*, and from the results of his investigations believed tannin to be present in combination with gentianin, the colouring principle of the root, and suggested it should be called gentiano-tannic acid.

On carefully testing twelve different samples of the root I obtained the following results:—Reduced to a coarse powder, macerated and exhausted with cold water, the watery extract, orange-brown in colour, was turned black with solution of ferric chloride, and also gave a light flocculent precipitate with a gelatine solution on standing. Another sample was treated with alcohol and filtered, the filtrate gave a dense black on the addition of ferric chloride solution, with a black precipitate on standing. The gelatine solution also produced a light brown precipitate. Another portion was macerated with alcohol and filtered, the residue being then treated with boiling water and again filtered, the filtrate of a pale yellow still turned a dark brown colour on addition of ferric chloride, and gave a slight precipitate with gelatine solution. On extracting the colouring matter from an infusion the colourless filtrate did not darken in colour or give any precipitate reaction with the two reagents used before.

I noted in those samples of the root used that were fresh gave better indications than those that were old and dry.

From the results noted I am led to conclude that tannin is present in some form in gentian root in small quantities and in combination with the colouring matter.

THE ANTISEPTIC ACTION OF HOPS.*

BY DR. HAYDUCK.

In a previous communication the author had stated, as the result of experiment, that hops do not influence detrimentally the alcoholic fermentation, but that on the other hand they retard the lactic acid fermentation. In a further investigation the author has sought to ascertain to which of the hop constituents this antiseptic action is due.

Oil of hops, as well as the hop tannin, proved inactive in suppressing the lactic acid fermentation. Better results were obtained with the bitter acid, as well as with certain resinous constituents which were separated by the following process:—

The hops were perfectly extracted with ether, and the extract, after removal of the ether, was dissolved in alcohol; this left a residue of a white wax which occurs in hops in considerable quantity, but which is of no importance in brewing. The alcohol solution was then treated with an alcoholic solution of acetate of lead, which threw down an abundant yellow precipitate. This was separated by filtration, carefully washed, and decomposed with sulphuretted hydrogen, yielding eventually a soft resin. The filtrate, after removal of the alcohol, was treated with light petroleum spirit, which took up a second soft resin that was left on evaporation of the petroleum. In the residue there was left a hard resin, which was insoluble in light petroleum spirit, but readily soluble in ether and alcohol.

In this way therefore three well characterized resins were separated from the hops:—

(1) A soft resin, precipitated by lead. If an ethereal solution of this resin be treated with solution of copper sulphate the ether is coloured an intense green; the resin therefore appears to form with copper sulphate a green compound soluble in ether. This resin is also soluble in light petroleum spirit.

(2) A soft resin that corresponds with the preceding in being soluble in light petroleum spirit and in giving the copper reaction, but differs from it in not being precipitated by lead.

(3) A hard resin which is not precipitated by lead, does not give the copper reaction, and is insoluble in light petroleum spirit.

The bitter acid is not obtained by this process.

All three of the resins behave like weak acids; in aqueous solution they are very instable and readily decomposed. The solubility of the resins in water is not constant, but if a quantity of resin be boiled with successive quantities of water the solubility gradually decreases.

No. 2 resin is related to the bitter acid of hops in that the acid is converted by oxidation into this resin. By numerous experiments it was ascertained that both this and the other soft resin, which appears not to have any relation to the bitter acid, act in a high degree upon the lactic acid bacteria as antifermentatives. On the other hand, the faintly bitter hard resin, which is contained in hops in larger quantity, has little or no antiseptic influence upon the lactic acid bacteria. All that can be said is that in the presence of this resin the development of the lactic acid bacteria goes on more slowly than in its absence. Neither of the resins influences the growth of mould.

The different bitter constituents of hops were also examined as to their influence upon the acetic acid bacteria, and it was found that the development of these organisms was not retarded by the resins.

* From the *Pharmaceutische Centralhalle*, Oct. 27.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 17, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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APPRENTICESHIP IN PHARMACY.

UP to the time of publication of our last number the letter from "A Disgusted Chemist's Apprentice" was the only spontaneous indication that the articles dealing with the subject of Apprenticeship in Pharmacy had received any attention. We cannot refrain from expressing a sense of disappointment that a subject of such fundamental importance in regard to the future of pharmacy should have failed to elicit from those interested a more appropriate response. The letter referred to is characteristic in many respects of a state of opinion that is not unnatural if all the circumstances of the case be taken into account, but at the same time it must be regarded as furnishing evidence that the present defective mode of working the apprenticeship system is fraught with serious detriment to the true interests of pharmacy. The chief cause that is mentioned as ground for a feeling of disgust and disappointment after a three years' experience in the business is a recognition of the fact, that the once flourishing first class business in which the writer has been engaged has been gradually declining, and that, in a general way, there is little prospect for a beginner but to enter into business on his own account on a level with the drapers, grocers, universal providers and what not who are now doing the trade that was carried on by chemists and druggists in a manner that is out of the question for chemists and druggists to attempt to compete with. Undoubtedly, that is no exceptional view of the situation, but one which must have presented itself to many an apprentice of late years, even before the time that he began to think of his future occupation, and of the prospects of making his living by the business to which he had devoted himself. And when we consider the tendency that has been developing in the business of the chemist and druggist for years past, it cannot be matter for surprise that such an unpropitious estimate of that business should be formed. The result thus painfully arrived at by the apprentice of to-day is but the natural consequence of the practice of promoting the sale of patent medicines and packeted proprietary articles, which involves no necessity for personal qualifications beyond those which the draper and the grocer possess, and it is unreasonable after the business of the chemist and druggist has been levelled down to the capacities of those traders to complain that they manifest a disposition to take to themselves a share in it, or even to monopolize it altogether.

The cry for protection against such a state of things is in every respect irrational. From the Legislature, which is supposed to give effect to public opinion, it is not to be expected that such protection will be afforded. And least of all can it be expected that the Pharmaceutical Society could be the means of obtaining protection against a state of things which is the natural consequence of a disregard of every principle which it has sought to uphold for the sake of promoting the true interests of pharmacy. But the evil to which expression is given in the letter of "A Disgusted Chemist's Apprentice" is not merely one affecting those who suffer from the competition of which he speaks. It has a wider and a more important influence, inasmuch as it affects the future of pharmacy proper. There is still no generally recognized distinction between that occupation and the lowest class of chemists and druggist's business, so far as the public is concerned. There is indeed but one qualification which confers the right to engage in the one or the other pursuit, and there is an almost total absence of any such influence upon the apprentices who aspire to occupy the position of principals in the future, as would lead them to appreciate the necessity of scientific education and technical training as the only means by which those engaged in the business of pharmacy can hope to protect themselves from the pressure of competition with traders who have no need for such qualification.

This is not the first time that reference has been made to the disorganizing and disintegrating tendency that is being developed in regard to the business which still comes under the vague designation of pharmaceutical, and the question whether pharmacy or chemist and druggistry is to survive can scarcely have escaped the attention of many as being one that must be faced before long. Of vast importance, so far as the settlement of this question is concerned, is the influence exercised upon apprentices. The habits of thought and practice which they acquire during the first years of their occupation in the business are more likely to be permanent than to be exchanged for others, and hence it appears to be one of the most essential conditions for ensuring satisfactory progress in pharmacy that apprentices should not only be good and well-prepared material in the first instance, but, also, that during their period of training they should be imbued with sound views as to the nature and requirements of their calling. That this is not generally the case now, does not, we think, require argument. How the deficiency is to be supplied is, however, a question that should engage the earnest attention of everyone who claims to be a pharmacist.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, December 14, 1887.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT, IN THE CHAIR.

The third Evening Meeting of this session took place on Wednesday last, when the chair was taken at eight o'clock by the Vice-President, Mr. T. P. Gostling.

The proceedings commenced by the reading of a paper entitled—

THE ALLEGED FUNDAMENTAL ERRORS IN THE BRITISH PHARMACOPŒIA.

BY EMERITUS-PROFESSOR REDWOOD.

The paper is printed at p. 497, and gave rise to the following discussion :—

The CHAIRMAN said he thought Dr. Redwood had given a very able and interesting reply to the strictures of Dr. Tichborne. Dr. Redwood had treated the subject very admirably and justified the course which had been adopted. He thought Dr. Redwood and the other editors of the British Pharmacopœia might take comfort from some of the remarks made by Dr. Tichborne, who had admitted that very few works containing such a mass of condensed matter were so free from errors.

Mr. UMNEY thought that Dr. Redwood had given a very good answer to the criticisms of Dr. Tichborne, but he would like to have an opportunity of reading the paper before he expressed any further opinion.

Professor ATTFIELD said he should have been very glad if the paper had been followed by a good discussion, for after carefully listening to what had just been read he was anxious to hear what was to be said on the other side. For that, he supposed, they must wait. He was, however, familiar with Dr. Tichborne's views on the subject of the weights and measures of the British Pharmacopœia, for they had come before him as one of the editors of the work, at the time their author brought them before the Pharmacopœia Committee in 1885, and they had also come under his notice as the Reporter on the British Pharmacopœia to the Medical Council, when Dr. Tichborne again moved that body at the end of 1877. He believed that the Medical Council had replied to Dr. Tichborne, both with regard to the application to it when the Pharmacopœia was in type and with regard to the application that the subject should be considered before the next edition was issued; and so far as he understood what those replies were, he entirely concurred in them. Now, however, the subject had been brought forward by Dr. Tichborne in his paper in quite a new dress; and it was matter for surprise and regret that he should have given his views the dress that he had given them, by entitling his paper, "Some Fundamental Errors in the British Pharmacopœia." One of Dr. Tichborne's views—perhaps his leading view—was that the temperature of 62° F. should be employed not only for imperial weights and measures, but in taking specific gravities, and in conducting volumetric solutions, whether by the metric or other method. That was a very old question, Dr. Tichborne had not initiated it; he had only imported it into his paper. Dr. Redwood would tell them that it engaged his most serious attention twenty or twenty-five years, if not before that time. Of course Dr. Tichborne had a perfect right to raise the question, and if he raised it properly they would be happy to discuss it, but he respectfully submitted that he had no right to do it under a damning title implying that the practice of employing a temperature of 60° F. for the specific gravities and volumetric operations of the British Pharmacopœia was a "fundamental error;" for the question was apparently, and indeed evidently, not one of error at all. The compilers of the Pharmacopœia had to consider the medical welfare of the public, and the manner in which medical men and pharmacists could best promote that welfare, and in his humble judgment they had wisely decided that that welfare would in the matter in question be best promoted by employing the temperature of 60° F. for the purposes mentioned; and chiefly for the reason that the temperature of 60° F. was employed by scientific men and pharmacists generally throughout the country, if not the world. However, that was a matter for discussion, but to stigmatize the practice as a fundamental error was to cast undue reflection upon those who adopt that practice. Another of Dr. Tichborne's views was that which relates to the employment of the metric system of weights and measures graduated and used at 60° F. Professor Tichborne said, and he thought rightly, that such weights and measures were not standard metric weights and measures, and then went on to say, wrongly, that nevertheless the British Pharmacopœia adopts and uses true standard metric weights and measures. But the Pharmacopœia did nothing of the kind. The position was as though the Pharmacopœia authorities said: "We recognize that metric weights and measures are standard at 39·2° F., but we, like nearly all the world, including, we warrant, Dr. Tichborne, adopt metric weights and measures graduated and used at 60° F." Of course Dr. Tichborne would say here, "then why call them metric weights and measures?" Well, what on earth would he call them? They must all admit that, for example, a pint was only an imperial pint at 62° F.; but if Dr. Tichborne were out on a thirsty walk in Wicklow on a hot day with the thermometer at 80° F. indoors, and desired to assuage a little of his thirst, he would not address the landlord of a welcome inn, as regarded any application for a quantity of ale approaching a pint, in any other word than pint. Perhaps he would invent some new name for the measure, or would he, on the spot, ask the presiding genius for "such a volume of ale as would at 62° F. be a pint?" However, the question was admittedly of little importance in a practical aspect; it was a question of error or no error in the Pharmacopœia. There was a common law, as well as a statute law, and he maintained that the compilers of the Pharmacopœia were acting in a legal and in a scientific as well as in a practical manner, in taking 10,000 grains of water or 1000 grammes of water and making either of these volumes a measure at 60° F. Then the third view that Dr. Tichborne took was "that a very equivocal position arose from multiplying standard grains throughout the work by specific gravities taken at 60° F.," but unfortunately he gave no illustration of his dictum. He (Dr. Attfield) had tested it just before he rose to speak, by multiplying the number of grains in six fluid drachms of water at 62° F. by the specific gravity of diluted sulphuric acid. He bore in mind that a fluid ounce, imperial measure, of water, taken at 62° F., contained by weight 437½ grains. That divided by eight would give 54·6875 for one drachm, and that multiplied by six would give 328·125, which was the weight of six fluid drachms of water, the apartment being at 62° F. Surely that same quantity in the same bottle would weigh the same amount if the temperature fell to 60° F. Then 328·125, multiplied by 1·094, the specific gravity of diluted sulphuric acid, would give the figures 358·96875, which were practically the same as those given in the Pharmacopœia, namely, 359. Where was the equivocal position there? He was tempted to allude to two of Dr. Tichborne's own errors which had not been referred to by Professor Redwood. Dr. Tichborne's paper was written within the last few months, and referring to the alleged errors, he said, "even to the present day, however, some of them stand uncorrected," and then he gave an illustration "such as that on page 27, where the manufacturer of sulphurous acid is directed to put 30 ounces of distilled water into a 20 ounce bottle." No doubt that error was made in the

original issue of September, 1885, but on referring to the reprint of the British Pharmacopœia, which appeared in 1886, he found that the error which arose from the word "pint" being put by a slip of the pen for "quart" had been corrected. And of course the correction was maintained in the 1887 reprint. How then was Dr. Tichborne led to say that the error still stood uncorrected? Then again, Dr. Tichborne alluded to a preface for 1887, but the fact was that he had made another error, for there was not one. It was of course merely a slip of the pen, like putting the word pint for quart, and he only alluded to it to show how erroneous were the criticisms. He agreed with Dr. Tichborne that only a small minority of the criticisms on the Pharmacopœia had turned out correct. He also agreed with Dr. Tichborne that considering the enormous amount of condensed matter in the Pharmacopœia, considering that there were nearly a thousand distinct monographs, each highly condensed, it was a matter of some astonishment that the errors should be so few. Nevertheless, as one of the editors, he regretted that there were any.

The CHAIRMAN said he thought in all criticisms of a work of this kind there should be one high motive, the hope of arriving at the truth. He was surprised to read the paragraph of the speech made by Dr. Tichborne, in which he said that he had two objects in bringing forward that paper: one was in order that the subject might be thoroughly investigated before the next Pharmacopœia should be brought out; and, secondly, every one liked to get credit for his own observations, and "he thought it desirable to put it on record that he had brought the matter before the Pharmacopœia Committee, who now no doubt would deal with it." He had great pleasure in moving a vote of thanks to Professor Redwood for his interesting paper and excellent defence of the Pharmacopœia.

The vote of thanks was accorded with acclamation, and briefly acknowledged by Dr. Redwood.

Donations to the Museum.

The Curator (Mr. HOLMES) described a number of specimens of sponges recently presented to the Museum by Messrs. Cresswell Bros., representing the principal types of sponges found in the Mediterranean. At the close of the Colonial Exhibition, a complete series of the Bahama sponges had been presented to the Museum of the Society, and these had been supplemented by specimens of the Cuban, and a very fine specimen of the Florida cup sponge, presented by the above-mentioned firm, who had since made the collection much richer by the fine series of Mediterranean sponges now exhibited, which included several varieties of the Turkey sponge (*Spongia officinalis*), of the honeycomb sponge (*S. equina*), and of the Zimocca sponge (*S. agaricina*). The difference in appearance between the different varieties of each kind, although not very obvious to the eye, was easily perceived the moment they were handled, when a great deal of difference was noticeable, some of them being very much softer and of stronger texture than others; this depended probably in part on the character of the locality in which they grew, in part on the temperature, and to a considerable extent also on the depth of the water, the finest sponges being obtained from the greatest depths.* There was also a specimen of falsely-packed sarsaparilla exhibited by Mr. Bird. The outside of the parcel was the red variety grown in Jamaica, which was generally much more starchy than the so-called "Jamaica" sarsaparilla from Costa Rica, and of a distinct orange-red tint. Inside the bundle there was a pale brown sarsaparilla, bearing some resemblance in the coarseness of its rootlets to the Guayaquil kind. The falsely-packed sarsaparilla had been experimented with, and had been found to yield hardly any extractive, and appeared to be sarsaparilla that had been exhausted, and then dried and resold. Instances of this kind showed how necessary it was to be cautious, not only to examine by the eye, but to carefully test the quality of the drugs met with in commerce whenever possible before purchasing. Then there was a specimen of *Sutherlandia frutescens*, presented by Messrs. Burroughs and Wellcome, which had been sent to this country apparently to more than one firm as a remedy for cancer. The plant is in cultivation in this country under the name of the Cape bladder senna, and was noticed in Dr. Pappe's little work on the medicinal plants of the Cape of Good Hope as a remedy for diseases of the eye. If it were now used as stated for cancer, the use was probably a comparatively new one. A preparation of the plant was being made, and would be tried, he understood, at the Cancer Hospital. The specimen on the table of strophanthus was of apparently a new variety, since the leaves of the plant, he believed, were smooth, although the seeds bore a strong resemblance to those of *S. hispidus*, as represented by a specimen presented many years ago by the late Daniel Hanbury. The leaves of *S. hispidus*, as well as the stem, were distinctly hairy. The specimen of *Naregamia alata* on the table was presented by Mr. D. Hooper, formerly a distinguished student in the School. The paper by Mr. Hooper, relating to the chemical examination of the root, might be found in a recent number of the Journal, October 15, p. 317. The next donation noticed was a specimen of monobromacetanilid, which had been made by Mr. Cheyne, a chemist at Messrs. Burgoyne, Burbidges, Cyriax and Farries, as an experiment. It was thought that the addition of the bromine would probably make the acetanilid compound more useful as a remedy in cases in which delirious symptoms occurred as well as a high temperature. The compound was stated to contain about 37 per cent. of bromine. Two specimens of a kind of double funnel, known as Nichel's patent, were exhibited, in one of which the inner surface was perforated with holes to secure more rapid filtration, and in the other additional pressure could be obtained by making a vacuum of the space between the inner porous surface and the outer part of the funnel.

Mr. CHRISTY called attention to some specimens of strophanthus which, he said, had just arrived from the Niger. In many points they exactly corresponded with the specimens which had been in the Museum of the Society for many years, brought over by Dr. Baikie. He would like to mention an interesting fact in connection with them. It had been known to many of those who had imported the strophanthus that an insect made its appearance in the seed which ate out the core; and if the seeds were kept for a year or eighteen months, it very often happened that they would be found to be all hollow—the inside having been bored out by a sort of weevil. The Niger people had evidently found that out, and as these bundles represent so much money to them, to prevent the ravages of the insect, it appeared that they had dipped them in some kind of balsam, resembling in odour balsam of Peru. When he examined those pods he at once detected this treatment from the colour and from the peculiar odour. The whole of the fibres of the pods were saturated with the balsam solution. The number of the pods in each bundle varied, but they all contained one uniform sort of seed. Mr. Christy also called attention to a sample of Indian grown coca leaves, which he said were in beautiful condition and of good flavour; they were about to be tested to ascertain what amount of cocaine they contained.

The Schanschieff Battery and Lamps.

At the request of the Chairman, Mr. Niblett briefly described some electric batteries and lamps on the Schanschieff system, which were exhibited. This primary battery is claimed to have a very high electromotive force with very low resistance. It consists essentially of a single fluid cell, the elements being carbon and zinc and the exciting liquid a special preparation of sulphate of

* *Pharm. Journ.*, [3], vol. xvii., p. 991.

mercury. In the reaction which takes place the mercury is thrown down in the metallic form and becomes available for preparing fresh quantities of the solution. Among the lamps shown were some miner's lamps, giving a light considerably superior to the ordinary safety lamp, and weighing (including the battery) but little more. One containing a three-cell battery, was stated to afford with once charging a light equal to two candles lasting during eight hours, or equal to a "shift," at a cost estimated at $\frac{5}{8}$d. The batteries being comparatively portable are applicable to many purposes, such as the source of a current for the application of the cautery or for minute lamps to facilitate the examination of the throat, etc. An eight-cell battery is amply sufficient for a reading lamp.

On the motion of the Vice-President, a vote of thanks was accorded to the donors and exhibitors of specimens.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 11th instant.

Present—The President, Mr. J. E. Brunker, M.A., in the chair, the Vice-President (Mr. Draper), Messrs. Pring, Payne, McCormack, Minchin, Doran, Hodgson, Charles Evans, Grindley, Wells, Ray, Dr. Montgomery, Dr. Collins, Professor Tichborne, Messrs. Allen, Simpson and Beggs.

Amendment of the Pharmacy Act (Ireland).

The President moved pursuant to notice,

"That the Council do now consider the suggested amendments of the Pharmacy Act adopted on April 2, 1884, and proceed to prepare final instructions for Mr. R. K. Clay, solicitor, for drafting a Pharmacy Act Amendment Bill."

The members had had these recommendations in print before them for some years. In consequence of the resolution passed at the last meeting, he called the Law Committee together (some gentlemen who had acted on the former Pharmacy Act Amendment Committee being associated with them), and they had an interview with Mr. Clay, from whom they learned that they might pursue either of two courses in promoting their Bill. One was to introduce it as a private bill, which would be attended with considerable expense. Besides the great expense of such a bill, notices for a private bill should have been served at a date which was now past to admit of its being introduced next session. It only remained, therefore, for them to introduce a public bill, which could be done without paying fees to the House of Commons, and the cost of which would be comparatively small, about £60 at the outside. As they were aware Lord Miltown had undertaken to introduce the Bill for them in the House of Lords; and Mr. Clay had undertaken, as part of his business, to put the Bill into the hands of members of the House of Commons who would take it up. They must themselves use all the influence they could bring to bear on members of that House. The amendments they had before them were settled after the interview with Mr. Trevelyan in 1885, and after the whole matter had been thoroughly discussed. He now moved the adoption of the first of these recommendations, viz:—

"That the Pharmaceutical Society of Ireland shall be given powers to require all *bonâ fide* chemists and druggists who shall have been in business on their own account on or before the first day of January, 1888, and who shall desire to continue that business, to make application, on or before a date to be named, to the Council of said Society to have their names registered: such application to be accompanied by a statutory declaration to the effect that they have been so engaged in business as *bonâ fide* chemists and druggists *on their own account* prior to the said 1st January, 1888, and also by declarations to the same purport made by two duly-qualified medical practitioners resident within ten miles of the place of business of the applicant. Such persons to pay on registration a fee not exceeding three guineas, and to be styled '*registered druggists.*'"

It would be impossible now to ascertain who were and who were not in business as chemists and druggists retailing poisons in 1875, and a large number of persons had gone into business as such since. On the one hand, it was necessary carefully to guard the rights of pharmaceutical chemists. On the other hand, they were aware that there were persons outside who were wishing for a second grade. The deputation who waited on the Council at its last meeting expressed themselves satisfied with the proposal he now made, but asked that it should be extended to apprentices. Whilst he sympathized with them to some extent, he adhered to his opinion that it would be utterly impossible to compensate all the interests involved. Any who were apprentices or assistants previous to 1875, and who had not gone into business during the last twelve years, were unlikely to do so for the rest of their career; and, therefore, he thought it would be a mistake to include in the recommendation any except those who were actually in business at the present moment. The body which the deputation represented had since held a meeting, and had passed certain resolutions, which they had sent up. These had arrived too late to be printed in the agenda paper; but he thought they ought to be read.

The reading of the resolutions referred to having been assented to by the Council,

Mr. Ferrall read the following:—

"North of Ireland Chemists and Druggists' Association. A general meeting of the Association was held on November 29, 1887, Sir James H. Haslett, Mayor of Belfast, in the chair, when the following Report of the Committee appointed to take into consideration the amendments to the Poisons Act and the Pharmacy Act proposed by the Council of the Pharmaceutical Society of Ireland, was submitted and unanimously approved and adopted as the views of the Association. The Honorary Secretary was instructed to forward a copy of same to the President of the Council to be laid before the next meeting:—

"*Report.*

"The Committee, while concurring in the general scope and tenor of the proposed amendments, unanimously recommend that in the contemplated Act provision be made for embodying the following modifications, viz:—

"1. That as neither branch of the trade could separately supply the wants of the public, arrangements should be made to establish on a permanent basis and corresponding examinations the two grades, viz:—'pharmaceutical chemists' and 'chemists and druggists.'

"2. That to avoid needless changes the dual term 'chemists and druggists,' as used in the Act of 1875, be adhered to as the official and legal designation of those so registered in accordance with the provisions of the new Act.

"3. That all chemists and druggists who were in business on their own account at, or prior to the passing of the Act of 1875, should be registered without examination on the payment of the fee of one guinea.

"4. That all apprentices, assistants, and those who may have entered business on their own account since 1875, be required to pass a modified examination and pay the prescribed fee ere being entered on the Register.

"5. That the payment of this examination fee 'once for all' should suffice, and no renewal of it in any guise whatever be demanded; but there can be no reasonable objection to registered chemists and druggists contributing to the funds of the Council of the Pharmaceutical Society some sum in the form of a subscription or annual payment, provided such carries with it the right to be

directly represented on the Council by a proportionate number of registered chemists and druggists. Provision could be readily made for such representation, and would tend to consolidate the two branches of the business and strengthen the Pharmaceutical Society.

"6. That the service of five years' apprenticeship with registered chemists and druggists, should qualify any candidate presenting himself for examination both under the Modified examination necessary for 'chemists and druggists,' and the Higher examination necessary for license to carry on the business of a pharmaceutical chemist.

"7. That in case of the death of a registered chemist and druggist, provision shall be made in the Act by which his business may be continued by a relative or legal representative with the assistance of a duly registered assistant for at least a reasonable time.

"8. That the provisions of the Act of Parliament exempting pharmaceutical chemists from the service of juries, be extended to include registered chemists and druggists.

"Signed on behalf of the Committee.

"SAMUEL CLOTHWORTHY, *Convener.*

"November 29, 1887."

The President: This is utterly inconsistent with what the deputation gave us to understand—better have it out of the way and be done with it.

Mr. Minchin, in seconding the motion of the President, said he thought the proposed declaration that the party had been in business as a chemist and druggist should be accompanied by one from a pharmacist, and that all should be decided on by the Law Committee of the Council.

The President said the point had been very carefully considered, and it had been thought very undesirable to throw upon either the Council or any members of the Society the duty of forming a judicial opinion as to the truth of the declaration of the applicant.

Mr. Wells said it would be well to put into the recommendation after the words "place of business of the applicant," the words, "or such other evidence as the Council may deem necessary."

The President: That is a good suggestion.

Mr. Payne asked how was it to be decided what a "*bonâ fide* chemist and druggist" was? They had a great many so-called "chemists and druggists" in his part of the country. There was one who had kept a post office, and also, immediately on hearing about the deputation, ordered pots and bottles, and had commenced to sell poisons within the last month. Was he to be taken in?

Mr. McCormack: The term might be restricted to chemists and druggists who had served an apprenticeship, and could produce their indentures.

Mr. Pring: Would you leave the word "chemist" out and say "druggist" only?

Mr. Wells: There are people in Dublin who sell drugs, but who are not chemists, and do not profess to be.

Professor Tichborne: There may be chemists and druggists who were in business at the time of the passing of the Act, but who never served an apprenticeship.

The President: The best way of arriving at the fact is by the deposition of the applicant.

Mr. Wells: But consciences are very elastic. A grocer or publican or draper in the country might say that he carried on business as a chemist and druggist, and might get two medical friends to certify that he had done so.

The Vice-President: We are always open to that kind of thing, but we should not assume that it will take place.

The President: I like to proceed on the supposition that the men I have to deal with are honest men.

The Vice-President said that any further definition of "chemist and druggist" would be exceedingly difficult.

Mr. Payne suggested that in order to prevent the Council from being flooded with applications from persons who would from the present time commence to sell drugs in order to qualify under the new Act the date in the recommendation should be 1885 instead of 1888.

Mr. Wells: I second that.

The Vice-President suggested that the date should be January 1, 1887.

Mr. Payne adopted this.

The President: Then we are unanimous as to the alterations.

The recommendation, with the addition of the words, "Or such further evidence as shall be deemed necessary by the Council," and the amount of the fee being changed from three to two guineas, was unanimously agreed to.

On the motion of the President the next recommendation was unanimously agreed to in the following form:—

"It shall be unlawful for any person to sell potent drugs or poisons, or to style himself a registered druggist, unless he be so registered, save and except a duly qualified pharmaceutical chemist, a licentiate of the Apothecaries Hall, or other duly qualified medical practitioner."

The next was unanimously approved of as follows:—

"It shall be unlawful for any registered druggist to keep open shop for the retailing, dispensing or compounding medical prescriptions, or to allow his premises or any portion of same to be used for that purpose."

The President said the next suggestion afforded an opportunity of repairing a defect in their original Act, by requiring all pharmaceutical chemists to pay a small fee to the Society.

Mr. Payne said there was a good number of licentiates, but very few members of the Society, and suggested that licentiates in business for themselves, or acting as managers for others, should pay 21*s.* annually, and that registered druggists in business for themselves or acting as managers should pay 10*s.* 6*d.*

After some discussion, on the motion of Mr. Payne, seconded by Mr. Allen, a recommendation was unanimously agreed to in the following form:—

"That all licentiates of the Pharmaceutical Society who are in business for themselves, and not being members of that Society, shall pay to the Treasurer of the Society an annual fee of 10*s.* 6*d.*, and all registered druggists in business for themselves shall pay an annual fee of 10*s.* 6*d.* on or before February 15 in each year; and that on or before March 15 in each year the registrar of the said Society shall print and publish a list of the said registered druggists, who shall have paid the said fee before the date aforesaid, and shall forward a copy of the same, with a copy of the Register of the Pharmaceutical Society, to the Inspector of Weights and Measures in each constabulary district, who shall be instructed to report any infringements of the Pharmacy or Poisons Acts coming to his knowledge, and who, upon obtaining a conviction against any person so infringing the said Acts, shall be entitled to one-third of the penalty imposed. And all persons on said list of registered druggists shall, until March 15 next following, be duly qualified to sell by retail potent drugs and scheduled poisons."

The following was unanimously agreed to:—

"The penalties for infringement of these clauses shall be the same as provided in the Pharmacy Act, and recoverable in the same way; and all by-laws and regulations for registration shall be subject to the approval of the Lord Lieutenant in Council."

The President said the next recommendation would require a little consideration. They all knew the impression that had been made on pharmacy in these countries by the decision of the House of Lords in the celebrated case of the Pharmaceutical Society of Great Britain *v.* the London and Provincial Supply Association, which presented the extraordinary anomaly that an incorporated society or company could legally do what, under

section thirty of the Pharmacy Act of Ireland, an individual who was not duly qualified could not do, namely, keep open shop for retailing, dispensing, and compounding poisons and medical prescriptions. The question was as to the best way of attempting to deal with this. The sections of the proposed English Act reached the difficulty by a circuitous route; but he was in favour of going at it directly.

Mr. Wells: I think so too.

The President moved the adoption of the following clause, remarking that any technical modifications that Mr. Clay should deem necessary could be made by him:—

"That the word 'person' in Sec. 30 of said Act shall be held to include and imply 'persons,' and any association of persons, whether as a partnership, society, or company (limited or otherwise), and that any such partnership or association of persons keeping open shop, as above, shall be held to be acting illegally, unless each and every member of such association shall be a person duly qualified to keep open shop under the Act."

The motion was agreed to unanimously.

The President said it was desirable to withdraw the clause about patent medicines, which though a very desirable one in a Government Bill would seriously load such a Bill as they could promote.

Mr. Hodgson: In France they are going to make it imperative where poisons are used in the manufacture of patent medicines that that fact should be specified on the label.

It was unanimously resolved to drop the clause.

The next clause was unanimously agreed to as follows:—

"To meet the case of a duly qualified pharmaceutical chemist or apothecary keeping more than one open shop for the sale of poisons or compounding of medical prescriptions, it is recommended, for the better protection of the public, that in every such shop in which such pharmaceutical chemist or apothecary shall not be himself engaged personally in its active management and control, he shall employ a person who would be himself a duly qualified keeper of such an open shop, and who shall be *bonâ fide* occupied in such shop; provided always that each partner in a duly qualified partnership may keep a separate shop for retailing poisons, or dispensing medical prescriptions."

The following was agreed to unanimously:—

"In order to fix the proprietorship of any open shop kept for the purpose of selling poisons or compounding medical prescriptions, it is recommended that the Registrar of the Pharmaceutical Society of Ireland may at any time deliver, or cause to be delivered, or shall send by registered letter to the premises about which information is required, a notice requiring the *bonâ fide* proprietor of such shop within seven days of the receipt of such notice, to furnish in writing to him a statement of the name and address of such *bonâ fide* proprietor, and of his qualification to keep open shop for the sale of poisons or compounding of medical prescriptions, and in default of supplying such information, the proprietor of such shop shall be liable to a penalty of £5 for each day during which default shall continue, and any person found during the continuance of such default selling poisons or compounding prescriptions, or acting in the management of such shop, shall be liable to a penalty of £5 for each such offence; such penalties to be recoverable by summary jurisdiction, and be paid to the Treasurer of the Pharmaceutical Society."

The following was also agreed to unanimously:—

"Any person who shall by any false or fraudulent representation, either verbally or in writing, procure himself to be registered under the Pharmacy Act (Ireland), or under any amending Act, and any person aiding and abetting him in the same, shall be deemed guilty of a misdemeanor, and shall, on conviction thereof, be sentenced to be imprisoned for any term not exceeding twelve months."

A clause was agreed to extending the period for filling up occasional vacancies on the Council to the second monthly meeting after the notification of the vacancy to the President.

Mr. Wells: We should have power to compel a man who has two shops, with a manager in one, to inform us who his manager is.

The President: That is already provided for under clauses 7 and 9.

The next business on the agenda paper was a notice that Mr. Payne would move that the following resolutions, adopted by a meeting of the Belfast Pharmaceutical Chemists' Association on November 18, be entered on the minutes:—

"On Friday evening, 18th inst., at an adjourned meeting of the Belfast Pharmaceutical Chemists' Association, called to consider the action of the Council of the Pharmaceutical Society of Ireland, in proposing to apply for powers to confer the privilege of selling poisons on those grocers and general traders who have been acting in open defiance to the existing law, it was unanimously resolved:—

"'1. That it is in the opinion of this meeting that the resolution carried at the last meeting of the Council, to apply to Parliament for an amendment to the present Pharmacy Act, does not represent the convictions of a majority of the Council, and that it was unconstitutional to snatch a vote on a subject touching the interests of every pharmacist in Ireland, by resorting to a committee recommendation of four years ago, without giving due notice of motion thereon.

"'2. That it is the opinion of this meeting that any amendment of the Pharmacy Act, legalizing the present illegal vendors of poisons (a deputation of which made representations to the Council greatly at variance to well-known facts), would not only be a great injustice to all legitimate traders, but a breach of trust on the part of a Council entrusted to administer an Act passed for the safety of the public, and the protection of its licentiates.

"'3. That this Association shall—should the Council persist in applying for powers to register any traders, other than those chemists and druggists who were keeping open shop at the passing of the Act of 1875—use every legitimate means to successfully oppose in Parliament a Bill which would sacrifice the vested interests of pharmaceutical chemists and other legitimate traders.

"'4. That all licentiates of the Society be communicated with, to enlist a general support in a strenuous opposition to a measure which was wire-pulled into existence for the special benefit of a few wholesale traders and their customers.

"'5. That Mr. J. C. Charles Payne be requested to bring the above resolutions before the Council of the Pharmaceutical Society of Ireland at its next meeting.'

"WILLIAM PROTT, Jun., *Vice-President.*
"ANDREW M'NAUGHT, *Secretary.*"

Mr. Payne: I withdraw these resolutions until we are able to communicate with the association in Belfast, and give them a draft of your Bill.

The Vice-President: Then if they are withdrawn, I beg to move that they be expunged from the agenda paper. When I say that the entire tone of these resolutions is objectionable, I merely express a personal opinion, leaving it to each member of the Council to form his own. I will say this, however, that the statement that this Council has proposed to confer any status upon "grocers and general traders" is no more in accordance

with the facts than is that other statement that it has endeavoured to snatch a vote—a suggestion quite unworthy of the source from which it emanates. All contemplated legislation has been expressly stated to apply only to *bonâ fide* chemists and druggists. But these resolutions contain a charge against certain members of this Council, so grave, and, so far as I know, so entirely false as to make its repudiation the more easy.

Mr. Payne: If the resolutions are withdrawn, the matter is not open to discussion.

The President: The Vice-President is moving that for certain reasons the resolutions be expunged from the agenda.

Mr. Payne: That is a different matter. I have withdrawn them and therefore they do not come before you.

The President: They can only be withdrawn by permission of the Council. I have put that question to the Council, and Mr. Draper is speaking on it.

The Vice-President: I say that these charges are not true, and that it is very easy to refute them. Resolution 4 states that the measure now under consideration was "wire-pulled into existence for the special benefit of a few wholesale traders and their customers." Now what are the facts? Mr. Payne was present at the meeting of April 2, 1884, and can hardly plead ignorance of them. In the years 1883-84, that is, at the period when this measure was under consideration, but four persons who are in any way "wholesale druggists" were members of the Council. Two only of these gentlemen—and they may not, it is just possible, feel complimented by me in presuming to count them among us, since, keeping open shop for the dispensing of prescriptions, they are hardly likely to support any movement which may not be to the advantage of the Society at large—were present at the April meeting. There remain two then against whom this calumny can only apply.

Mr. Wells: The motion for leave to withdraw these resolutions should be put to the meeting; and if they are withdrawn we should not discuss them. There is nothing before the chair.

The Vice-President: I have before me in print a very grave accusation.

Mr. Payne: The better way will be for me, with the permission of the Council, not to withdraw them, but to let them go forward if they are to be discussed. Certain statements have been made in good faith; but I believe at the same time that they are absolutely apart from the actual facts. If one is to appear in print so must the other.

The President: Well, do you wish to withdraw them or not? I must say that personally I could not consent to their being withdrawn. I got a notice that certain resolutions would be moved. I could not allow the notice to appear unless the resolutions appeared also. They have appeared upon the agenda. They contain false statements and a most gross imputation against the honour of certain members of the Council, and therefore against the Council itself. Whatever the opinions of the rest of the Council may be, for my part I could not consent to their being withdrawn.

Mr. Simpson: I think they should not be permitted to be withdrawn, for if they are to go to the Journal the refutation of them should go also.

Mr. Wells: Let the President put the question as to whether they are to be withdrawn or not.

The President: I have already remonstrated with Mr. Payne about allowing them to remain on the agenda. Is it the pleasure of the Council that these resolutions should be withdrawn? (No answer.)

Mr. Simpson: I rise to a point of order. I think they should not be withdrawn until we have heard Mr. Draper's remarks.

Mr. Wells: If the matter is to be discussed——

The President: I have put the motion, and no one has taken the trouble to vote.

Mr. Payne: If the resolutions are to appear it is also perfectly right that the refutation should appear. But the idea I had in asking the permission of the Council to withdraw those resolutions which I was asked to bring forward was that they should not appear in the Journal. That was my object.

The Vice-President: Then they must be expunged from the agenda.

Mr. Payne: Then we had better go on; and if so it is my privilege to bring the matter before the meeting. I must tell you that a meeting of a society called the Belfast Pharmaceutical Chemists' Association was held. I do not happen to be a member of it. I was waited on by its secretary, who asked me to bring this matter before the Council. The object of the meeting was to take into consideration the deputation which waited on this Council, and certain statements which were made here. I consented to bring those resolutions forward in order that the Council might discuss the subject, and hear the views of a number of licentiates of the Society in the North of Ireland who are members of the Belfast Pharmaceutical Chemists' Association. I beg to propose that they be entered on the minutes.

Mr. McCormick: Am I in order in asking Mr. Payne where these gentlemen got their information from?

Mr. Wells: I second the motion of Mr. Payne; not that I have any sympathy with the resolutions, but to put the matter in form.

The Vice-President: I shall go on. Two of the four gentlemen present at the meeting of 1884 keep open shop for the compounding of prescriptions: and the only other two to whom this calumny can apply are Mr. Hodgson and myself. I am always sorry to have to say a word on any purely personal matter, but I feel that I should be doing an injustice to my friend Mr. Hodgson if I did not leave him to speak for himself, or if I were to couple his name with mine, except so far as to emphasize the fact that neither he nor myself were present at that meeting. Now as regards myself I have held a place at this table for a great many years, and all who have sat with me will bear me out when I say that during that time no one thing affecting the interests of this Society has in the slightest degree been influenced by my business. Under other circumstances this is a thing which it would have been quite unnecessary to say here; but Belfast—with whom we have had hitherto so entirely amicable relations, and to whose pharmacists I for my part accord that meed of respect which they have hitherto so honourably earned—while geographically so near to us, is, it would now seem, morally so far away that she does not yet know that we in Dublin may possible be influenced by honest motives. And that some pharmacists in Belfast conscientiously believe that we are not, there can be no reasonable doubt. And now I would ask Mr. Payne, as representing that Association——

Mr. Payne: No, I do not—I do not. I do not represent them.

The President: You are responsible for their words.

The Vice-President: I ask Mr. Payne, as representing the Association, which, in its enthusiasm for its own interests—and that they are perfectly legitimate interests I concede—has allowed itself to make this serious accusation, to name any one instance in which a member of this Council, being a wholesale druggist, has acted in favour of his own interests as against the welfare of the Society. I say that resolution 4 is not only a libel upon a quite small and comparatively unimportant number of its members, but is a direct accusation of connivance with that minority on the part of every member of this Council, Mr. Payne himself not excepted, he having been present at the meeting of April, 1884. I may add that Mr. Payne has been with us in every single motion brought forward this afternoon, so that we have managed to work wonderfully well, notwithstanding this tirade against us.

The President: It is a very great pity that when

gentlemen came together for their own interests, as well as those of the rest of the body of pharmaceutical chemists, they could not find some formulæ more consistent with the facts than the resolutions which have been sent up here. The first contains two express falsehoods, and when we go further on we find gross imputations against the honour of the entire Council, Mr. Payne himself included.

Mr. Hodgson said that he had from the very beginning of that Society been a member of its Council. He had a great deal to do with the obtaining of their Act of Parliament; and if it had not been for the original Chemists' and Druggists' Society, of which he was President, he did not believe that the Pharmaceutical Society would be in existence at that moment. The very men who were pointed at by these resolutions—Mr. Draper, their worthy Vice-President, Professor Tichborne, Mr. Doran, Mr. Hayes, Mr. Simpson, Mr. John Brooks and himself—were men who banded themselves together, and after having carried on a vigorous agitation for a series of years, eventually succeeded in obtaining the Society's Act. When discussing it with Sir Michael Beach in London, they strove hard to have twenty-four members on the Council, but were obliged to give in to his opinion that there should be only twenty-one. They had been members of the Council ever since, and had never ceased to take a deep interest in the Society. For his own part, Mr. Payne was aware that he was of opinion that there should be two grades—pharmaceutical chemists, and another class who, after having passed a modified examination, should be entitled to sell poisons. His opinion might be wrong, but he was entitled to have it. Certainly, people ought not to be allowed to sell poisons all over the country without having passed any examination at all. But that he was capable of being a party to the "snatching" of a vote, or of acting from merely selfish and personal considerations was untrue, and he repudiated the charge with the greatest possible scorn.

Mr. Pring in seconding the motion that the resolutions be expunged from the agenda paper, said that he took part in the interview with Sir Michael Beach before the Society's present Act was drafted, and urged upon Sir M. Beach that it was a mistake not to have two grades, namely, "pharmaceutical chemists" and "druggists," but Sir Michael would not give in.

Mr. Payne in reply repeated that he was not and never had been a member of the Belfast Pharmaceutical Association. The President said that there were two direct untruths in the first resolution. He (Mr. Payne) was given to understand by the Secretary of the meeting, that so far as they were concerned they had got no notice of the resolution passed by the Council. It came forward in connection with the reception of a report from the Law Committee. That was the explanation of their statement that it was brought forward without due notice. No member of the Council could have previously known that it was to come on. With regard to the second resolution, those who took part in the Belfast meeting had a right to the opinions expressed in it; and as regarded the third resolution the Belfast Association had a right to oppose any Bill that should be put forward by that Council if they thought proper. But coming to the fourth resolution why an old and respected member of the Council, for whom he (Mr. Payne) had the greatest regard, should consider that it in any way applied to him he (Mr. Payne) could not imagine.

The President: Then whom does it apply to? "Wholesale traders and their customers."

Mr. Wells: It applies to the deputation which attended here the other day. It was stated in the *Chemist and Druggist* that two wholesale gentlemen in Belfast offered to give £50 each towards opposing our Bill. Who are the "wirepullers" now?

The Vice-President (to Mr. Payne): I am sure you do not identify yourself with these resolutions.

Mr. Payne: The Vice-President and the Secretary of the Belfast Association told me to whom it did apply; but I distinctly assert that it does not apply to any members of this Council, but to certain persons whom I had better not mention, but who are not in Dublin.

The President: The next time they pass resolutions they ought to publish footnotes to them.

Mr. Payne: It applies to the deputation which waited on this Council. It does not apply to any wholesale or retail dealer in Dublin, nor does it apply to any member of the Council.

The President: I say most positively that there was no such thing as the "unconstitutional snatching of a vote." Every member of the Council knows that very important business, including reports, comes from the Law Committee, which cannot be fully set out on the agenda paper, and that very important business has been done on reports from the Law Committee. The second untrue statement is that a "committee recommendation" of four years ago was resorted to. So far from that it was the fourth discussion that took place on the subject before a full Council; and in those discussions Mr. Payne himself took part. Now Mr. Payne allows himself to appear here as adopting those untrue statements.

Mr. Wells: No.

The President: As to the explanation now given of the fourth resolution it would require very copious notes to satisfy the Council that an imputation is not made on itself and its members.

The Vice-President: The resolution says, "wire-pulled into existence." That has reference to something which began in 1884.

Mr. Wells said they all knew and respected Mr. Payne, and it looked rather like throwing the lie into his face for any member of the Council to doubt him. I think we have a right to respect his words as much as those of Mr. Hodgson or Mr. Draper. I myself believed all along that this thing referred to Belfast wholesale chemists—there are other wholesale chemists in Ireland besides those of Dublin.

The Vice-President: I have already said that I am delighted to have elicited from Mr. Payne the statements he has made.

Mr. Payne: Well, Mr. President, I can only assert again that I had no information beyond what I received from the President, Vice-President, and Secretary of the Belfast Society, and that information was conveyed to me two nights since. I pointed out Mr. Draper and Mr. Hodgson, and was distinctly told that there was no intention of applying it to any member of this Council, particularly yourself, the Vice-President and the Treasurer.

Mr. Simpson said every member of the Council understood why these resolutions had been brought forward, and no one there thought the less of Mr. Payne for having done so; nevertheless he believed that if a show of hands were taken that moment on the question, nine out of ten of those present would say that Mr. Hodgson and Mr. Draper were pointed at.

Mr. Wells: Mr. Draper was in the chair when we discussed the main subject two or three years ago, and I defy anybody to say which way he went.

Mr. McCormack: Does Mr. Payne know where those gentlemen got their information?

Mr. Payne said the gentlemen with whom he communicated said something in the *Chemist and Druggist*.

The motion that the resolutions be expunged from the agenda paper was then put and carried *nem. con.*

A letter was received announcing the death of Dr. Baird, the Secretary of the Smithsonian Institution.

On the motion of the Vice-President, seconded by Mr. Allen, a resolution of regret was unanimously passed.

On the motion of Mr. Allen, seconded by Mr. Payne, the present examiners were re-elected for the ensuing year.

Some financial business was disposed of, and the Council adjourned.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at 103, Great Russell Street, W.C., on Thursday, December 8, Mr. T. S. Dymond, President, in the chair.

After the reading and confirmation of the minutes of the previous meeting, the President called upon Mr. S. R. Atkins, J.P., to read his address.

Pharmaceutical Politics.

BY S. R. ATKINS, J.P.

It is my privilege, at your renewed request, again to address this Association. By your courtesy I propose to say something to you on the present aspect of "Pharmaceutical Politics."

The wise man tells us there is a time and a place for everything; may I venture to hope that this is a fitting place, and the present not altogether an inopportune time for such a theme.

The following reflections have been committed to paper, amidst the presence of many and varied engagements, and so at the outset I must crave your kindly indulgence for the absence of that sequence of thought and logical connection which ought to be but is not present.

Allow me, before I further go, to congratulate you on the continued, and, I trust, the augmented usefulness of your Association, the necessity for which, more especially in this big city, needs no argument. The social and the scientific needs alike of your nature and your craft have careful and adequate provision made for them, whilst the moderation of your proceedings, indeed, I may say, the very conservatism of their spirit, has not merely disarmed earlier hostile criticism, but secured the friendly co-operation of some who once stood aloof, whilst the loyal hearty support you have given to an advanced educational policy redounds infinitely to your credit.

Gentlemen, I am addressing you as assistants in the various pharmacies of the metropolis. Most of you, I suppose, have passed the qualifying examination of the Pharmaceutical Society; others are preparing to pass. Some of you hold the Major qualification; others are meditating an attack on that citadel, having lately assaulted and carried the lower fortress. Most are already associates of the Pharmaceutical Society, whilst the remainder could complete the alliance at an early date; but should I be speaking to any young men not connected with the Pharmaceutical Society, nor in full sympathy with it, I should like to avail myself of this favourable opportunity to press its claims on your thoughtful consideration.

The Pharmaceutical Society is an institution vigorously assailed in certain quarters; at this I am not much surprised, nor do I complain. When we speak of the Society, to be accurate, we really mean the Council of the Society, and the Boards of Examiners. Neither of these bodies suffer from criticism, however severe, if it be at all fair.

A large number of assistants scattered all over the kingdom, who have been unsuccessful in the examinations, can hardly be expected to cherish a warm affection for an Alma Mater who has rejected them, most unnaturally failing to discover the ability which to more partial eyes was so evident.

The severe, increasing and protracted competition in the drug trade, affecting at least 90 per cent. of its members; the unjust inequitable position of pharmacy in Great Britain, through the miscarriage of justice in the final court of appeal, coupled with the deadlock in the legislative machine, have driven many men almost to despair, and others into sullen moroseness; and as a victim in the concrete is necessary to be offered up, nothing could be more conveniently assailable for the purpose than the Council of the Pharmaceutical Society. Such anger is as unreasonable as it is illogical. The Council is powerless in the matter; the excessive competition of the day it is as unable to control or check as was Canute the tide advancing at his feet.

The Council is not composed of men who, having made a competency and retired from active service, are indifferent to the struggles of the toilers in the waves; some of them are hit as hard as any member of our craft can be; self interest if not sympathy would prompt to action if success was possible.

I know on the best of authority, from direct personal testimony, borne in from a most varied correspondence, the shrinking revenues, and the consequent straitened circumstances, of many excellent well educated men. One hesitates to tell them that the struggle they are called to face is a struggle no legal shield can protect them from, but is a part of the action of that political economy, the pressure of whose weight we each and all are called to bear in varying degrees.

Let me however say again, what I have said elsewhere, that we pharmacists have a case against public sentiment and existing legal dicta. Public sentiment and public safety alike demand of us training and efficiency, but we are the solitary instance at this moment in Great Britain in which the recognition of that qualification is denied us in a protected sphere for our industry. Such injustice in the very nature of things cannot continue for ever; whenever we have the chance of making ourselves heard in the House of Commons, our claims will be inadequately presented if legislation in our favour is withheld.

The ground of our appeal is perfectly clear and reasonable. It is not in restraint of trade; it is not the action of a trades' union body, but that of an association of men to whom the State has delegated important functions, whose functions are usurped by uneducated, unqualified poachers, though shielded for the nonce by the Limited Liability Act.

I have said that a portion at least of that competition from which we are now suffering is beyond the province of our Society to touch or relieve, but is a part of the great national, I may say, world-wide movement, affecting the entire body of producers and traders. An important inquiry affecting our own distinct guild is, are we harder hit, financially, than other traders? I am scarcely prepared to admit that we are. Living, as I do, in the midst, and largely dependent as I am on the agricultural interest—an industry that has to face the hard economic fact that under existing conditions not a sack of wheat grown in England is grown at a profit—I am perfectly certain we cannot compete with the British farmer in the race of losing. And as to the bulk of the trading interests of the country, it would be manifestly impossible, without accurate statistics, to form a reliable decision; my belief, however, is, that considering the smallness of the capital invested in the average pharmacy, we are not suffering more than other traders.

There is, however, one fact adverse to our prospects, and not generally recognized when these questions are debated; the increased and ever-increasing attention bestowed on the study of sanitary laws, and as a consequence the improved health of the people. Doubtless, we share with the entire community the blessings of purer air and water, and better sanitation in our dwellings; but it is quite evident that just in the measure of the progress of these beneficent agencies—in short, just in the measure of prevention, will healing not be needed.

Amongst the many accusations levelled at the Council, is, not merely that it has failed to protect the interests of pharmacy, but that it has increased the sorrows of the coming race by raising the educational status.

I am prepared, gentlemen, in your interests, most loyally to defend the action of the Council in this particular. From no selfish motive, but on behalf of pharmacy generally, I would be no party to induce a large

number of young men to enter our ranks by making that entrance easier. Surely, the competent can have no wish to be swamped by the influx of less competent competitors. I am bold enough to ask you to bless the Council for its desire to raise the standard of your attainments. Englishmen make a serious mistake in shortening so much the period of training for the real work of life; the financial, and to a certain extent the social success of your after life, will be in the ratio of the quality and duration of your preliminary experience.

Permit me to say a word as to the mode in which the Council conducts its business.

I am not here to defend all its transactions. I am for the moment thinking only of the mode. That we make mistakes I freely admit, and I share the responsibility of them, but I do claim for my *confrères* honesty of intention, purity of motive, and self-sacrifice in respect to time and labour.

We have been roughly handled by a section of the pharmaceutical press for conducting a portion of our deliberations in committee. Now, inasmuch as some years ago I took an active part in obtaining permission for other than the official reporter to be present at our meetings, I think I may be permitted to speak freely on this subject.

I think it would be in the interests of the trade most inexpedient that all our deliberations should be conducted in public. True we are the representatives and hence the servants of those who return us to parliament, but we consider that the interests of our constituents are best promoted by debating certain questions in the sheltered confidence of committee, at least during the early period of examination, when opinions are slowly and cautiously framed upon the evidence which comes before us.

I do not say that we do not perhaps sometimes act with needless caution in going into committee, judged by the subsequent evidence of the self-control with which the debate was conducted; but on the other hand I have often felt thankful for the existence of a Committee, as I have reflected on a prolonged, and it may be somewhat confused discussion.

Over and beyond this, a portion of the work we have to perform is necessarily confidential in its character, and harm might be inevitably, though unwittingly, inflicted on others by publicity.

If you have confidence in your representatives, you must leave in their hands the discretion of determining committee or no committee. If the Council has forfeited that confidence, the constitutional remedy is in your hands—displace them with better men.

It is true, that the amount of work accomplished is vastly in excess of the reported debate, a rare but most honourable exception in public assemblies, and resulting chiefly from two facts, the existence of large representative committees, in which, by a process of wholesome devolution, the multifarious detail work of the Society is really done, and further, the comparatively modern though excellent practice of making the Chairman of a Committee the reporter to the Council. The privilege of challenging a recommendation, or seeking further information, is not sacrificed by any member of Council, whether an integral part of the Committee or not.

As a Society we have been fortunate in the position of our head-quarters in London; the tenure, also, in which we hold our property in Bloomsbury Square is exceptionally favourable. But we have been crippled in our action for lack of space. Within a comparatively recent period an opportunity presented itself for acquiring an area for enlarged accommodation by erecting new buildings—that opportunity the Council, after careful consideration, deemed it prudent to seize.

You will remember, gentlemen, that we are both an educating and an examining body: it has been contended for by some influential men amongst us that we ought to be only the latter.

I have opposed that view, and urged that we should endeavour to become a true pharmaceutical university, as complete as possible in all our appointments, an ideal university both in teaching and examining. I would make the teaching arrangements of our university as complete as possible—standards of excellence—models for other schools in the thoroughness of the training. The thoroughness consisting, as it necessarily must, of three factors—a staff of competent teachers, a suitable building with the requisite appointments, and a curriculum of sufficient length to permit of the exhaustion of the syllabus of study.

These needs have been carefully considered and provided for in the professional staff. Of the gentlemen composing that staff I will merely remark that I know they have the confidence and respect of the Council, and they deserve to have the confidence of every student who enters our school. But the staff needed ampler arrangements for teaching—housing and apparatus more in harmony with modern requirement.

Our teaching staff is now complete, or nearly so, and in a short time the new and elaborate facilities for your convenience and advantage will be available, whilst the third particular, the length of time in which you will avail yourselves of these advantages, must depend on students themselves. And I say, here is an arena in which, so far as the scientific and technical part of your training is concerned, you may fitly prepare for your business life.

Lest I should be misunderstood, let me observe that I gladly recognize the fact that there are other good schools of pharmacy in London beside our own, conducted by able men. Their mutual rivalry, in so far as it does not stimulate cram, is a distinct gain to the student.

But to return to the Square. Whilst our theoretical teaching in respect of pharmacy has been good, we have not been able, for want of room and apparatus, to give practical instruction or demonstration. That defect will shortly be remedied.

It is a sorry reflection on our apprenticeship system that our young men have been taught so little of this subject by those who covenant to teach them, but so it is, and the next best thing, and indeed the only thing that remains to be done, is to supply other men's lack of service, and demonstrate the processes of the Pharmacopœia on such a scale as our convenience may admit of. This is a new departure I hail with great satisfaction; it promises to meet a felt need, and ere long will show results in the examination room.

The equipment of a laboratory for the prosecution of original research stands on a different footing. Eminently to be desired both for the sake of science, and also to advance the status of pharmacy as a co-ordinate authority in medicine, the proposal must be conditioned entirely by our financial ability to execute it.

I thoroughly agree with the drift of some practical observations recently addressed to this Association on the subject by a most competent authority; indeed, I would go further, and quote the words of Von Humboldt as applicable to the situation:—"The thing is, not to let the schools and universities go on in a drowsy and impotent routine; the thing is to raise the culture of the nation ever higher and higher by their means."

The mutual labour and comparison of the physiologist, therapeutist, and pharmacist, in their investigations are much needed, and I know nothing in which the joint contributions of wealthy men, or some portion of the corporate funds of the great medical bodies, could be better applied, than in work of this sort. Still my distinct conviction is, that the Pharmaceutical Society will finds its available resources otherwise required.

We are custodians of an inheritance far too valuable, and too much needed in these days of contracting income, to be hazarded in an enterprise however desirable in itself, and possibly even brilliant in its work, if the sinews of war are wanting.

Pray do not misunderstand me. I am an enthusiastic admirer of the research worker and his work. Thankful indeed should I be, if the Society could adequately endow a chair of research. No worthier employment of a small portion of the national expenditure, now often so hopelessly wasted, could be suggested than the promotion of research.

The boundlessness of the field of inquiry fascinates the imagination. The possibility, nay, let me say, the absolute certainty, of the obligation under which we should place society from these discoveries that wait only the combined touch of genius and the patient plodding of the true scientific worker; the insatiable longing of the human mind to pierce the secrets of the undiscovered; the suffering and its attendant sorrow that may be mitigated and soothed, if not removed, by the discovery of new principles and new remedies: these considerations, and others that might be enumerated, constitute a powerful impulse to undertake the work.

There remains however the commonplace prosaic reflection, "that we have not got the money." Perhaps I ought not to say this, as the subject is still under consideration; and I am satified that the issue of the Council's deliberation will be judicious.

Now, gentlemen, I have had a motive in thus at length addressing you on your relations to the Pharmaceutical Society.

There are two facts in the pharmaceutical world which all loyal pharmacists must sincerely lament: the supineness of a large number of our body to all that concerns the wider and higher interests of the trade as represented by our Society; and the other fact is the senseless hostility of a minority to the Society, or rather to its executive, the Council.

Gentlemen, you are the pharmacists of the future. Ere long Providence will have fixed for yourselves and the young men you represent, the sphere of your life's work. I ask you, gentlemen, scattered as you will be in a few years, all over the United Kingdom, to do what you can to remove the antagonism and the indifference to which I have referred, by the loyalty of your own conduct to the Pharmaceutical Society, and by that persuasive intelligence which in removing ignorance will convert prejudice to friendship.

The Society has a statutory authority. Its Charter and Acts of Parliament constitute it an integral part of the machinery of government in the country; our dissentient friends are scarcely likely to be rid of us, if they try. And past efforts to create another Society—I scarcely like to use the term "rival society," for in the Birmingham Trade Protection Society it would not be just so to describe it. The men who conducted its affairs were well affected towards ourselves; indeed, some of them influential members of our own Council. Moreover, there was much cogency in the argument that the Trade Association did work we were either unable or unwilling to do. I always thought, and still think, that the Pharmaceutical Society ought to cover the entire ground of assailed interests by its powerful protection, and that it ought not to be necessary that I should belong to a second and supplementary association.

I merely notice this controversial point in passing. I have referred to the defunct association as proving that a second society has small chance of prolonged existence.

Of course, these observations are not intended to apply to the defence agency of Messrs. Haydon and Glaisyer, which I hope will succeed.

I have, in imagination, followed you into the future; from these days of assistantship and probation to the actual experience of your responsible life.

The results of that experience will necessarily be most varied, but by an inevitable and beneficent law, will, in the main, be characterized and proportioned by your fitness and your personal honour.

My own business life is, by an irreversible law, very much a thing of the past; still, I have a son who, like yourselves, has an interest in coming days.

The problem before you seems to my mind to shape itself thus: You will have to face a competition of intellect and of trading of which we knew comparatively nothing in our younger days, and no legislation can shield you from such strife. This is your disadvantage. Your advantage is, that you enter on the campaign with an equipment of intellectual, technical, scientific training, which the pharmacists of a former generation had no means of acquiring, except as the result, in rare instances, of great personal sacrifice. You will succeed with Heaven's blessing, and, of course, possessing the requisite business faculty, just in the measure of your knowledge, just in proportion as you have mastered the science of your craft, and this will depend on the thoroughness and duration of your student life, using that phrase in its broadest and most comprehensive sense.

Gentlemen, for that future you have my hearty good wishes.

The President was sure that the absorbing interest with which the address had been listened to was the greatest compliment that could be paid to Mr. Atkins's eloquence. The subjects treated were essentially pharmaceutical topics of the day, and as such would commend themselves to the attention of the whole body of pharmacists. He hoped the members would often be able to listen to remarks from Mr. Atkins, as he considered his papers were models of clearness and conciseness.

Mr. J. Ince, in proposing a hearty vote of thanks, said that he was glad to find his own views were so much in accord with what Mr. Atkins had expressed. Referring to the discussions in committee of the Council, he deprecated any alteration of the existing method, which he believed was advantageous alike to the Society and to the members. Attacks had often been made upon the Society for combining the functions of teaching and examining, but he would remind them that the Society came forward and established a school at a time when pharmaceutical education was absolutely neglected. At the period to which he referred there were no facilities whatever for the education of pharmacists, for although a course was open at a few of the hospitals, those who had followed it had found it of no practical value, as it partook of too much of a therapeutical nature. He considered, therefore, that it would be a most retrograde step for the Society now to abandon its teaching duties. Comparing the pharmaceutical students of this country with those of France, Belgium and Switzerland, he thought that the high standard that was reached on the continent was due solely to the thorough preliminary grounding which they received, whereas in this country professors and teachers often had to turn schoolmasters for some considerable period in order to remedy the defects of earlier education.

Mr. W. G. Blackam seconded the vote of thanks, which was carried with acclamation.

Mr. Atkins thanked the members warmly for the reception they had given him, and also for the hearty vote of thanks.

The proceedings then terminated.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, December 8, Mr. E. J. Eastes, Vice-President, in the chair.

The following note was read by the Secretary, in the author's absence.

Further Note on the Estimation of the Alkaloids of Conium.

BY R. A. CRIPPS.

On June 23, in a report read before this Association, I proposed a new method of assaying conium fruits. Since

that time I have succeeded in confirming the practical value of the process, both as regards accuracy and rapidity of assay. I trust I may therefore be allowed to quote the details of the process from that report with one or two slight modifications. "Five grams of the finely powdered fruits are mixed with an equal weight of fine sand, and introduced into an extraction apparatus, a mixture of 25 c.c. of 95 per cent. alcohol, 15 c.c. of chloroform, and 10 c.c. of hydrochloric chloroform," allowed to percolate through the powder. (The hydrochloric chloroform is prepared by passing *dry* HCl into chloroform until it fumes copiously, and contains about 0·5 per cent. of HCl, not 5 per cent., as erroneously stated in the report.) Heat is then applied in the usual way, the liquid collecting above the marc, and by removing the source of heat is allowed to percolate through six times; this operation usually occupies from two to three hours. When cold the marc is tested for coniine, and should fail to give more than the faintest turbidity with Mayer's solution or iodine solution added to its faintly acid aqueous extract; and when dried and treated with sodium hydrate the odour of coniine should be scarcely perceptible. The chloroformic solution is then agitated in a separator with 25 c.c. of distilled water, the watery liquid separated, and the dark coloured chloroformic layer again washed with 25 c.c. of water. These acidulated aqueous solutions are in turn washed with chloroform, then made alkaline with soda, and washed three times with chloroform. The chloroform washings are successively run off into another separator containing alkaline water (the nozzle dipping below this water) to be washed, thence into a tared dish containing an ethereal solution of HCl, keeping the nozzle of the separator below the surface of the ether. This acid ether chloroform solution is evaporated in a current of air, and the residue dried at a temperature not exceeding 90° C.; it should be crystalline, and almost perfectly white. The dish and contents are then weighed, and the Cl estimated by nitrate of silver solution, using chromate of potassium as an indicator. From the amount of chlorine found the alkaloidal hydrochlorates may be calculated, 35·5 of Cl being equivalent to 163·5 of *coniine* hydrochlorate. With the same sample of fruits I have obtained the following results:—

By weight of hydrochlorates obtained 1·10 per cent., 1·14 per cent., 1·11 per cent.

By calculation from $AgNO_3$ used 1·08 per cent., 1·11 per cent., 1 09 per cent. (nearly).

The advantages claimed for this process are:—

1. It dispenses with the troublesome and inaccurate methods of distillation.

2. It exhausts the drug as completely as any other method, and none of the alkaloid is lost during the subsequent treatment.

3. The alkaloids are obtained as definite crystalline salts by evaporation of an ethereal solution, whereas the free alkaloids are volatile together with the ether or other solvent employed.

As it is evident that the above process extracts the other alkaloids, besides coniine, I was anxious to discover, if possible, the actual nature of the alkaloids obtained. The amount of material required to satisfactorily determine this being very large, I was obliged to content myself with a very rough examination. For this purpose 1 lb. of conium was exhausted by repercolation with the solvent, and the alkaloids removed as above, except that ether was used instead of chloroform for dissolving the liberated alkaloids, and the ethereal solution was dried over chloride of calcium, and the ether removed by very gentle heat. The alkaloidal residue did not measure 1 fluid drachm. Its specific gravity was taken in a Sprengel tube and found to be ·926. Coniine is said to have a specific gravity of about ·846. By rough fractionation about three-fourths passed over at or below 166° C., leaving a darker coloured residue, which crystallized on cooling. This is, no doubt, conhydrine. The lighter fraction became a mass of white crystals by the application of bromine vapour, which is one of the tests of the purity of coniine, according to Watts. The amount, however, did not admit of taking its specific gravity or boiling point accurately.

A discussion followed, in which the Chairman, Messrs. Williams, White, Bird, and the Secretary took part.

A Report on Organic Chemistry was then given by Miss M. E. Buchanan, which dealt with cyanogen and some of its compounds with organic radicles, and included the following:—

Note on a Reaction of Hydrocyanic Acid.

Some little time ago, I had a prescription presented to me, which at first sight appeared very simple, but in the dispensing of which one or two points turned up, that I hope may interest and prove of use to some of you.

The prescription ran as follows:—

℞ Codeiæ, dissolved in ac. phosph. dil. . gr. j.
Ac. hydrocyan. dil. . . . . gtt. xx.
Tr. iodi . . . . . gtt. x.
Aq. ad ℥iv., misce, ft. mist., etc.

The first time of making it the codeia was dissolved as directed in the ac. phosph. dil., the tr. iodi then added, when a copious brick-red precipitate took place; but on addition of the HCy this was dissolved and an entirely colourless mixture was the result.

The question then presented itself, what was this precipitate? and why was it thus dissolved? Of course many of you will know that the ppt. was the iodo-salt of the alkaloid, a solution of iodine in KI being a general reagent for the detection of alkaloids; but as these iodine compounds are insoluble in dilute acids, one was at first at a loss to see why such a weak acid as HCy should dissolve it, and also decolorize all the remaining iodine in the solution.

The mixture was again made, this time by adding the HCy to the tr. iodi first, when a colourless solution resulted. (Three drops of the B.P. acid were more than enough to decolorize the 10 minims of tr. iodi.) The solution of codeine was then gradually added, a slight red precipitate being produced at each addition, immediately dissolving, however, evidently in excess of HCy.

This action of HCy on this iodo-alkaloid served to draw attention to the rather peculiar action of HCy on iodine compounds in general. It forms with free iodine, ICN (cyanide of iodine or iodide of cyanogen), thus,—

$$HCy + I_2 = HI + ICy.$$

This is a white crystalline substance, subliming at 42° C., readily decomposing, however, into free iodine and cyanogen. It is most easily obtained by dropping iodine into a saturated solution of KCN, as long as it is decolorized, then shaking with ether, to dissolve the crystals of ICN formed, and evaporating the ethereal solution. As, however, a little of the KI formed at the same time is dissolved by ordinary ether, it is best to sublime the product at as low a temperature as possible. It can also be made by subliming a mixture of $Hg(CN)_2$ and iodine, HgI_2 and ICN being formed, the former not being volatilized at the temperature employed. Chloride and bromide of cyanogen also exist, in fact, are perhaps better known than ICN. Each of these may be obtained in two forms, represented by the formulæ CNCl and $(CN)_3Cl_3$.

The action of HCy on a weak compound of iodine, such as the iodo-alkaloid above mentioned, is to withdraw the iodine and combine with it, forming ICN, leaving the alkaloid as the original salt that was taken—in the case of this prescription, it would be left as phosphate of codeine. In another instance, in order to see if the original salt was regenerated, the iodo-sulphate was precipitated from sulphate of quinine, then dissolved in HCy, when the resulting solution had the characteristic strong fluorescence of quinine sulphate solution.

After a discussion on the report, Mr. Bird exhibited a

bundle of sarsaparilla, which looked very good on a casual inspection, but which on being opened was found to be made of a core of very inferior looking roots surrounded by an external envelope of much finer appearance.

The meeting then adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS' AND APPRENTICES' ASSOCIATION.

The fourth meeting of the tenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, December 7, at 9.15. Mr. George Lunan, President, in the chair.

The minutes of last meeting having been read and approved, the Chairman called upon Mr. George Melvin to read a paper on—

The Botany and Materia Medica of the Natural Order Leguminosæ.

Mr. Melvin began by saying it was not his intention to say anything very original. His remarks would be addressed more especially to those who had still to cross the "river" of the examinations, and he must therefore ask the indulgence of the senior members. He proposed to touch upon the leading characters of the order, and in doing so he described the very interesting observations of Sir John Lubbock and others on the subject of fertilization. Dealing with the importance of the order, he quoted the well-known testimony of Lindley, and referred to the incident related of Linnæus, who, when visiting the north of Scotland, came suddenly on a whole hillside completely covered with the exuberant golden-yellow blossom of the common broom, and was so overcome by the spectacle that he fell on his knees and worshipped. Mr. Melvin then described the various parts of a plant, taking as illustrations various plants belonging to the order. The leaves were illustrated by fresh specimens of *Acacia Melanoxylon*, and three other species of acacia showing tripinnate leaves and phyllodes; also a branch showing examples of transition forms between true leaves and phyllodes; and also the flowers characteristic of the sub-order Mimoseæ. Other examples of exceptional leaf structure were the grass pea (*Lathyrus Nissolia*), having leaves indistinguishable from ordinary grasses, and common furze (*Ulex Europœa*), the lower leaves of which are transformed into sharp pointed spines, up to the point where the plant attains a height beyond the reach of sheep and other mammalia, when they assume their true flattened form. The floral envelopes and the andrœcium and gynœcium were then described and illustrated by means of diagrams, the interesting arrangement of the papillionaceous corolla, the diadelphous stamens, and the stigma for the purpose of securing cross fertilization, being fully and lucidly explained.

The second part of the paper was devoted to the official medicinal plants belonging to the order. These were briefly dealt with, principally in connection with their geographical distribution, and the sub-orders in which they were classed. Those found in South America, India, Asia Minor, Africa and Britain, were arranged in five groups, the respective characteristics of which, as regards climate, soil, situation, general appearance and commercial products, were described in an interesting and comprehensive manner.

The paper was illustrated by diagrams, fresh and herbarium specimens of leguminous plants, and specimens of the official materia medica yielded by the Leguminosæ.

On the motion of the Chairman, a cordial vote of thanks was awarded to Mr. Melvin with acclamation, and on the motion of the latter, a similar vote of thanks was awarded to Mr. Wilson, Assistant-Secretary, for preparing the diagrams.

The discussion which followed was taken part in by Messrs. Ainslie, Baker, Crowden, Duncan, Hill, Lunan, Macallum, Mackenzie, and Turnbull.

In reply to the recent inquiry by Mr. Gerrard as to the reputed use of common furze as a diuretic in Scotland, Messrs. Lunan and Melvin mentioned that they had seen it administered to horses, in the form of an infusion, but no one had heard of its use otherwise.

Some queries were read by the Secretary and postponed to a future date, and the meeting was then closed.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act.

At the Liverpool County Court, on Tuesday, December 13, before his Honor Judge Thompson, the Council of the Pharmaceutical Society of Great Britain, plaintiffs, *v.* Mac Simon and Co., defendants.

Mr. Flux appeared for the plaintiffs.

Mr. Killey appeared for the defendants.

At the sitting of the Court Mr. Killey applied for an adjournment to allow of the attendance of counsel who had been instructed, and Mr. Flux not objecting it was ordered accordingly.

After the period of the adjournment Mr. Flux informed the Court that in the interval, the defendants, acting under the advice of counsel, had paid into Court in the action the amount sued for, viz., a penalty of £5, incurred by the keeping of open shop for the retailing and dispensing of poison.

Mr. Flux then made application for exercise by the judge of a discretion vested by statute in him to order in the plaintiff's favour costs as in actions for sums above £20, on the ground that the powers so to do were applicable in all questions of importance to the public, that the case in the Court was brought under a statute which, in its opening sentence, declared it expedient for the benefit of the public that persons keeping open shop for the retailing, dispensing and compounding of poisons should possess competent practical knowledge of their business, and be examined, and that the defendants had contested the case to trial.

The judge inquired the nature of the defence.

Mr. Flux said that, as he had understood, the defendants had intended to rely upon their being a partnership firm carrying on a business in Scotland, and to contend that Scotch firms were quasi corporate bodies, and that as corporate bodies did not stand in peril of the penalties under the Pharmacy Acts, so their partnership firm was not, neither were the partners in it, in peril of those penalties either in Scotland or in England.

Mr. Killey said that the chemists' department of his clients in Liverpool was conducted by, and the sale in question had been made there by a registered chemist; and therefore, according to some decisions, his clients had not broken the law.

The Judge (addressing Mr. Flux) inquired how the matter stood on decisions?

Mr. Flux said he must admit that there existed a decision of the House of Lords to the effect that corporate bodies, such as the Corporation of that City, and even Joint Stock Companies (having common seals) could not be hit for penalties under the Pharmacy Act, 1868; but that within the limits of his knowledge—which he believed extended to all the cases—no decision had extended that rift in the statute, and, in fact, no Court had ever decided that unqualified persons could derive qualification, or escape the penalties by the employment of servants on the Register of Chemists and Druggists.

Mr. Flux also corrected the statement which had been made that the sale in question had been by the hand of a duly qualified person, and said that as matter-of-fact the label used disclosed the name of the person, and reference to the Register showed that his name did not appear on it.

The Judge having referred to the statute conferring on him power to do so, said that the case appeared to be distinctly within the class contemplated by the Act of Parliament, and he should accordingly order that costs in favour of the plaintiffs, on the scale for cases above £20, be paid by the defendants.

Judgment accordingly.

Obituary.

CAMILLE-JEAN-MARIE MÉHU.

We regret to have to record the death, on the 29th ult., of Dr. Méhu, at the age of 52 years. Dr. Méhu was born at Dijon and graduated there as Bachelier-es-Sciences in 1853. His first official appointment was as aide-pharmacien in the central pharmacy of the civil hospitals in 1858; shortly afterwards he went to the Midi hospital, and thence in 1862 he was appointed chief pharmacist in the Necker hospital. Three years afterwards he took up the degree of Doctor of Medicine, and in 1880 was elected a member of the Academy of Medicine, in the section of pharmacy. Meanwhile he had also become a member of the Paris Pharmaceutical Society and filled the office of President in 1880. In 1881 he represented both these societies at the International Pharmaceutical Congress held in London. Only a few months since Dr. Méhu was elected a Honorary Member of the Pharmaceutical Society of Great Britain. Dr. Méhu was the author of a large number of chemical treatises, the tendency during the last few years being towards pathological subjects; but one notable exception to this was a translation of Sutton's 'Volumetric Analysis.' He was also for many years one of the editors of the *Journal de Pharmacie et de Chimie.*

Notice has also been received of the death of the following:—

On the 23rd of November, Mr. Benbow Backhouse Marson, Chemist and Druggist, Park Road, Liverpool. Aged 51 years.

On the 7th of December, Mr. James Cartwright, Chemist and Druggist, Hessle Street, Hull. Aged 87 years.

On the 7th of December, Mr. Robson Horner, Chemist and Druggist, late of Victoria Dock Road, London. Aged 39 years.

On the 8th of December, Mr. Charles William Sutton, Pharmaceutical Chemist, late of Stowmarket. Aged 54 years. Mr. Sutton had been a member of the Pharmaceutical Society since 1860.

On the 10th of December, Mr. Samuel Horton, Chemist and Druggist, Meliden Road, Liverpool. Aged 41 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

An Apprentice's View of the Future of Pharmacy.

Sir,—The letter which you print in the Journal of December 10 from an Apprentice, seems to me worthy of more attention than it is likely to receive.

Likely to receive—for to judge by the lack of criticism and correspondence which followed Sir Dyce Duckworth's important address, and your leaders on "apprenticeship," it seems as if our profession were lapsing into a state of indifference which bodes ill for its future vitality. And yet the letter is worthy of attention, for it puts before your readers clearly and forcibly the position in which many young men now find themselves who, on discovering their first step in life has been taken under a misapprehension, feel half inclined to retrace their steps while they may.

It is neither my business nor desire to give a stranger advice or defend the Pharmaceutical Society, but I would ask our apprentice if he does not think the members of the Council are individually as interested in raising the average income of chemists and druggists as he is himself, and whether they are not affected, as we all must be, by the revolution through which the retail trade is now passing. He should, too, clearly discriminate between what the Council would like to do and what the Council can do, and when he has come to the conclusion as to the desirability of protection must decide as to its possibility. Let him consider, too, that the medical profession are contending with similar difficulties, and where they fail to obtain the necessary sanction to have things all their own way the Pharmaceutical Society has very little chance of succeeding.

But may I, without presumption, emphasize Apprentice's appeal to the Council to look the future fairly in the face, and take the trade, as a whole, more fully into its confidence. Not very long ago, I called upon a number of chemists residing in this neighbourhood to obtain their signatures to a memorial for placing pharmaceutical chemists on the Pharmacopœia Revision Committee.

I wish our worthy President and the members of our Council could have accompanied me on that round. I do not for a moment suggest that a tithe of the bitter things I heard were deserved, or that the reproaches flung at the Society were not due to mistaken impressions, but this I know full well, that in all directions there was an ill-defined, but none the less bitter feeling that the Society had failed in its duty to those it should have protected, and that it was scarcely worthy of support.

Now, I would urge upon the Society to strain every nerve to remove this feeling, and to be practical, would suggest that a circular be forwarded to every non-subscribing chemist in London, inviting them to a meeting in the lecture hall at Bloomsbury Square, there to hear an address from our President on what the Society has done, and what it can and cannot do; such a meeting would certainly lead many to join who at present entirely hold aloof.

To be successful in its future action, the Society must be strong, and the first step in this direction must be to gain the support of the majority of those it represents.

116, *Denmark Hill, S.E.* T. H. Powell.

Sir,—I notice in your issue of December 10 a letter from a "Disgusted Apprentice" on the future of pharmacy, and I hope that the insertion of his communication may be an excuse for my troubling you.

I gather from Apprentice's letter that after a three years' trials he has come to the conclusion that he will neither be respected in society nor his profession, and I am afraid I must agree with him; for when a man, after such experience, harbours such ideas of his work and sphere, he seldom rises above the level of a disappointed grumbler.

No chemist can doubt for a minute the reason of Apprentice's disgust, for the effects of the "store" system hamper us on all sides, but is it a proper course to despair of one's position immediately it is assailed? Truly, I hope not; and I hope there are few of Apprentice's way of thinking.

The only hope he has for the future lies in the State—forgetting the maxim that "few are helped who help not themselves."

Does he think that because we are too little versed in trading, too pettyfogging, too weak-kneed and timorous, we are unable to withstand the breeze of competition, and must needs have a parliamentary overcoat to keep the air off? Then I say we ought never to exist, we are a clog on the wheels of progress, and ought to be eliminated, and we shall as surely go to the wall as an obsolete organ in the realm of biology. Such pharmacists (*sic*) as Apprentice would make better grocers and oilmen, and the sooner those are "disgusted" the better. Does he think his knowledge, scientific ability and experience, merit his nursing by the State? I am afraid his allusions to the Council and "Pil Antib.," etc., but too plainly evidence the line to which he ought to belong, and the protection he ought to have.

I quite agree with him that something ought to be done, and done quickly, and I would call on all assistants and

apprentices to strengthen the hands of the Council, and show it they will not be behindhand in availing themselves of allthe higher education secured by its endeavours.

I feel certain, from personal questioning, that were the Society to go in for a higher status and a more stringent examination immediately, fully 75 per cent. of assistants and apprentices would support them by their attendance on curriculum and examinations. Let us do away with the present farce of a Preliminary examination, and have an examination worthy our calling. Let it include French, German, mathematics, and physics, as well as the present subjects. Let us abolish the Minor and Major with their clique within clique, and have a two or three years' curriculum, capped by a qualification that will enable us to hold up our heads in the presence of our Continental brethren. And then let us approach the State, confident of our ability and public respect, and we shall triumph, and will wring our rights from those professional (?) men, who would fain fatten on our presumed ignorance.

But for a mongrel lot of chemists, oilmen, and paint vendors to seek State protection on the ground that they have passed three months in a "cram" school, and qualified (?) "by examination" after that, can only end in failure and ridicule.

Fellow apprentices and assistants, bestir yourselves! Patent medicines and commoner drugs have slipped from you; make an effort to get your due. Quit ye like men, and show the world that if education will carry the day you will triumph, for as sure as you lag and despair you will come under nature's ban, and "the weak shall go to the wall."

Bedford. A Hopeful Apprentice.

Sir,—It was with a feeling of regret that I read "Disgusted Chemist's Apprentice's" letter in your Journal of December 10.

I have always carried the idea that things were brighter in the city, and therefore under this impression lulled myself to contentment, as I would soon stand the chance of "coming up to London;" but certainly your correspondent gives me but little encouragement. He says that chemists are suffering from want of protection, and that grocers, etc., ought to be prevented from selling drugs. Well I think it is their feeling that they also ought to be prevented from chemists entering their line, and selling Tower tea, etc. They think chemists ought to be compelled to close on weekly half holidays, in order to prevent their customers (who, perhaps, are hard up for a cup of tea or a biscuit) to be tempted to go to a chemist's shop for the same, since it cannot be got at the grocer's.

We must admit that the profession is losing ground fast, although there are gentlemen of honourable intentions belonging to it yet.

What say you of chemists, nay, M.P.S.'s, who do not hesitate in supplying customers with an ounce of shag on Sunday, as often as they like? Yet tobacconists close their establishments on this holy day.

Indeed, we have a good example of a member of the profession in the *Chemist and Druggist* a few weeks ago, who even boasted himself of being able to deceive the Revenue, and make a wholesale trade in "Mist. Vini Gallici" to thirsty persons on Sunday. It certainly is disheartening to run down our own trade, but it is far from what most of my young friends expected when they went up for their examination and paid their premium, to be made dumb tools, and which is handled by its superior. But we can yet hope for better days.

Aberystwith. "No Bonno Johnie."

The Benevolent Fund.

Sir,—The annual election of assistants upon our Benevolent Fund once again brings before us the claims of this class, and leads us to the consideration of the provision we thus make for our necessitous brethren. It is a subject which has frequently been brought before the attention of the Council in various ways, and I venture to hope that the time is not far distant when the special claims of those who not only have been members of the Society, but have also in their more prosperous days possibly been subscribers to this Fund, may be fully recognized.

It is unquestionably a privilege as well as a duty to assist to the utmost of our power the wants of all our brethren, irrespective of other surroundings when misfortune meets them, but that those who have not only stood by the Society in supporting its work for the supposed general good of the trade, but have also given of their substance towards this Fund, should not have some tangible advantage beyond the mere additional votes derived from their subscriptions, has always seemed to me hardly just. I believe that the Council would be acting wisely and beneficially to the real interests of the Fund itself, were they to make the annuity to former members of the Society, or subscribers to the Fund under sixty-five years of age, £40, and above sixty-five, £50.

I hope that some members of the Council may take up this subject and persevere until success crowns their efforts.

154, *Marina Parade, Brighton.* Edwin B. Vizer.

The Acidity of Syrupus Ferri Phosphatis.

Sir,—Mr. J. F. Brown, in your last issue (p. 496), is not correct in regard to the quantity of acid necessary to combine with 360 grains Fe to form $Fe_3(PO_4)_2$; it is equal to 7 fluid drachms 43·3 minims of the B.P. concentrated acid, not 11·6 fluid drachms, as he states.

Mr. T. B. Groves had previously kindly pointed out to me the deficiency in the 'Extra Pharmacopœia' formula; 9½ ounces should be read "10 ounces, 7 drachms, and 43 minims." The error is fortunately on the right side. The fourth edition of my book was published before Mr. Conroy's paper.

The present formula orders 1¼ ounces of concentrated acid = 8⅓ ounces of the diluted, against 5½ ounces of the latter in B.P. 1867, *i.e.*, half as much again. Why this excess has been ordered is not evident, although Mr. Conroy says, "it is rendered necessary (?) by the increased quantity of iron phosphate that the syrup now contains," owing to the precipitation of the phosphate of iron being aided by bicarbonate of sodium in place of acetate of sodium. The saving of loss is not 10 per cent. Mr. Groves finds the loss by the 1885 process is 5 per cent., due almost entirely to oxidation. I found the loss by the 1867 process was 12½ per cent. The 1867 formula was certainly acid enough; it ordered of the diluted acid 27½ minims in the drachm, the dose of this preparation (which is supposed to be specially intended for children). Now it is increased to 41·7 minims, or this equivalent of the diluted acid in the drachm, whereas the dose of the diluted acid itself is given as only 10 to 30 minims. Very little of the acid used in the process can in any sense be said to become combined. Taking the quantities of the B.P. as an experiment, I precipitated the phosphate according to the directions, and on collecting the precipitate, giving it a squeeze of course, but without loss I noticed, I found it was easily soluble in about one-third the acid ordered; 4 drachms in place of 10 drachms made a perfect solution in a few minutes. This when filtered measured 17 drachms; if the other 6 drachms of acid not used had been added it would have measured 23 drachms, or barely 3 fluid ounces. But now comes the absurdity, we are told to "add water and sugar and dissolve without heat." Why should we not add cold simple syrup in an equivalent quantity? 9 fluid ounces being equal to the 8 ounces of sugar ordered, this with a drachm of distilled water added to the liquor would have produced the 12 fluid ounces of syrupus ferri phosphatis required. In place of using my whole lot of liquor in this manner, I divided it into two equal portions: one I finished off as above described, producing a syrup of B.P. specific gravity; the other I diluted with the requisite amount of syrup and water q.s. to 6 fluid ounces, thus producing a syrup having 4 in place of 10 drachms of acid as ordered in B.P. It made a syrup in appearance equal to B.P., and up to the present it has shown no signs of deposit; I mean to keep these for reference. The latter may become opaque—I know the 1867 preparation did not, but both will be less likely to turn dark-coloured or solidify than the 1885 preparation.

It has been said that French pharmacy as represented by the Codex might be summed up in the one word, *sugar*. The British Pharmacopœia is sadly deficient in this article, and the wholesale trade consider syrupus ferri phosphatis particularly so. If made containing only 8 ounces of sugar in 12 fluid ounces it is "too thin" they think and does not command a ready sale. Even by my process much more sugar, or rather simple syrup, can be used without diffi-

culty, but I do not for its keeping properties recommend such addition; I should be more inclined to dilute the preparation with more syrup and make it only contain half a grain of the phosphate in the fluid drachm. My experience of these very acid syrups is that when given after meals to children, in place of acting as tonics they generally cause a fit of indigestion and destroy their palate for the next meal.

The present process for syrupus ferri phosphatis in other respects is a very unpharmaceutical one. Why should the phosphate be precipitated and become partially oxidized when direct solution of the iron may be made in the acid? It is like taking a voyage to Edinburgh in an old sailing vessel when by rail we could get there in a few hours. Liquor ferri phosphatis is often kept by pharmacists which can be diluted with a certain proportion of syrup. My experience of such has been that they do not keep so well as the syrup itself.

I trust in another edition of the British Pharmacopœia we may have a more satisfactory process given.

10, *New Cavendish Street.* WM. MARTINDALE.

Sir,—In your last issue Mr. J. F. Brown draws attention to the formula given in Mr. Martindale's 'Extra Pharmacopœia' for the above preparation, and points out that the amount of phosphoric acid therein ordered is in deficiency of the requirements of the British Pharmacopœia. That this is so will be evident to anyone who compares the two formulæ, but the difference is not so great as Mr. Brown makes it out to be.

The processes themselves differ, for whilst the B.P. directs the solution of ferrous phosphate to be prepared by dissolving freshly precipitated phosphate in phosphoric acid, Mr. Martindale orders it to be made by the action of phosphoric acid upon iron wire; a process much easier and simpler than that of the B.P.

Working by the official process, 96 fluid ounces of the finished product will contain 10 fluid ounces of concentrated phosphoric acid in the free state, while Martindale's, on the contrary, only contains 9½ fluid ounces, minus the amount used up in converting the iron into ferrous phosphate. The question is, as to how much of the acid goes into combination.

Taking as the basis of calculation the equation—

$$3Fe_2+4H_3PO_4=2Fe_32PO_4+6H_2$$

we find that 6 parts Fe require 7 parts H_3PO_4 for saturation.

The strength of an acid of sp. gr. 1·50 is 66·3 per cent. H_3PO_4 by weight; and hence one fluid ounce (656·25 grains) contains $\frac{66{\cdot}3\times656{\cdot}25}{100}=435$ grains available H_3PO_4.

Now if 6 grains Fe = 7 grains H_3PO_4

∴ 360 „ „ = 7 × 60 or 420 grains of H_3PO_4,

i.e., a trifle under 1 fluid ounce phosphoric acid sp. gr. 1·50, and not 1½ fluid ounces, as stated by Mr. Brown.

If it be required to prepare a syrup by the process of the 'Extra Pharmacopœia,' which shall contain the exact amount of ferrous phosphate and free acid as the B.P. syrup, the following will be found to fulfil the necessary requirements.

Take of—

Iron wire (polished)	360 grains.
Syrupy phosphoric acid, s. g. 1·50 .	11 fluid ounces.
Distilled water	9 ounces.

Place in a glass flask, plug the neck with cotton wool, and heat till dissolved. Filter the solution into 72 fluid ounces simple syrup, and pour sufficient water over the filter to make the product measure 96 fluid ounces. In my opinion Mr. Martindale's process is an improvement upon that of the B.P. The syrupus ferri phosphatis of the B.P. is a most disagreeable preparation, owing to the large amount of acid it contains. If the quantity ordered be reduced by one-half, a preparation is obtained which, whatever its defects or demerits may be, has at least the merit of palatability.

Buxton. R. WRIGHT.

POISONOUS PROPERTIES OF RHODODENDRON LEAVES.

Sir,—In the supplementary note upon Trebizonde honey by Mr. E. M. Holmes (*Pharm. Journ.*, 1887, p. 400), it is recorded that Mr. H. Clark states that eight sheep which ate rhododendrons in Syndall Park, Laversham, were found dead the next morning with rhododendron leaves in their stomachs. In the discussion upon the paper I mentioned that a case of suspected poisoning of sheep by rhododendrons had occurred in my own neighbourhood. I have since quite satisfied myself that the stomachs of the sheep contained considerable quantities of rhododendron leaves, and there appears to be little doubt that the sheep were poisoned by these leaves. It is noteworthy that the description of the symptoms of the sheep closely correspond with the effect of the honey upon Xenophon's army. It appeared to me desirable to confirm my previous statement, for apart from the interest it might have as connected with Trebizonde honey, rhododendrons are very frequently cultivated in parks, and their poisonous properties appear not generally to be known (even such botanical works as I have speaking doubtfully on the subject), therefore I do not think that their dangerous character can be too widely published.

Colchester. J. C. SHENSTONE.

PHARMACEUTICAL WEIGHTS AND MEASURES.

Sir,—The *Lancet's* correspondent, whose communication you note in the Journal December 10, has not I fear mastered the weights and measures of the Pharmacopœia. I have not seen his letter, but assuming your note to be correct, I fail to see what advantage would accrue from the use of measures graduated as he suggests.

He seems to think that a solution containing 1 grain in 100 minims is of the same strength as the B.P. 1 per cent. solutions (*e.g.*, liq. morphinæ et strychninæ), thus confounding the grain measure with the minim.

After the publication of the new Pharmacopœia you inserted a letter (Sep. 26, 1885), in which I stated some objections to the alteration in the strength of the solutions of the more active drugs. Since then I have only become more fully convinced that the Editors in this departure made a very undesirable change. Frequently, in course of conversation with members of the medical profession—from the "first year" to the fully-fledged M.B.—I purposely introduced this subject, and almost invariably discover a "haziness" regarding the weights and measures of the Pharmacopœia, and the relation of the one to the other.

JOHN.

PIL. RHEI CO.

Sir,—I always understood that one of the fundamental principles in the weights and measures system of the British Pharmacopœia, was that all liquids should be by measure, and solids by weight (except where the contrary is stated). Evidently, Mr. Downing, with all his honourable intentions, does not think so, for in making his mass "strictly B.P." he ingeniously continues to leave out one-fifth of the glycerine ordered, by "weighing" it; hence his excellent results.

ANOTHER OF THE CRAFT.

EARLY BOTANICAL AUTHORS.

Sir,—I agree with Mr. F. Porter Smith that Turner's works were well deserving mention in my brief sketch on Botany and Vegetable Pharmacognosy delivered recently before the Manchester Pharmacy Students' Association, and regret that I inadvertently neglected to mention and ascribe to Turner that esteem which was due.

Manchester. WM. ELBORNE.

Erratum.—Saccharin and Borax.—Mr. Gravill writes to call attention to the fact that in his letter published last week (p. 495) his figures having reference to the strength of the solution of borax used are misquoted. The passage should read, "I find that by operating on 1 grain of borax (Howard's) in 25 c.c. of water," and not "256 c.c.," as printed.

A. Graeme.—The necessary correction has been made in the reprint of the Pharmacopœia.

G. W. Williams.—Your memorandum has been handed to the Secretary, to whom all complaints respecting the transmission of the Journal should be sent.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Welborn, Venables, Groves, Thorne, Stainer, Baldock, Bell, Viator, A First Year's Pupil.

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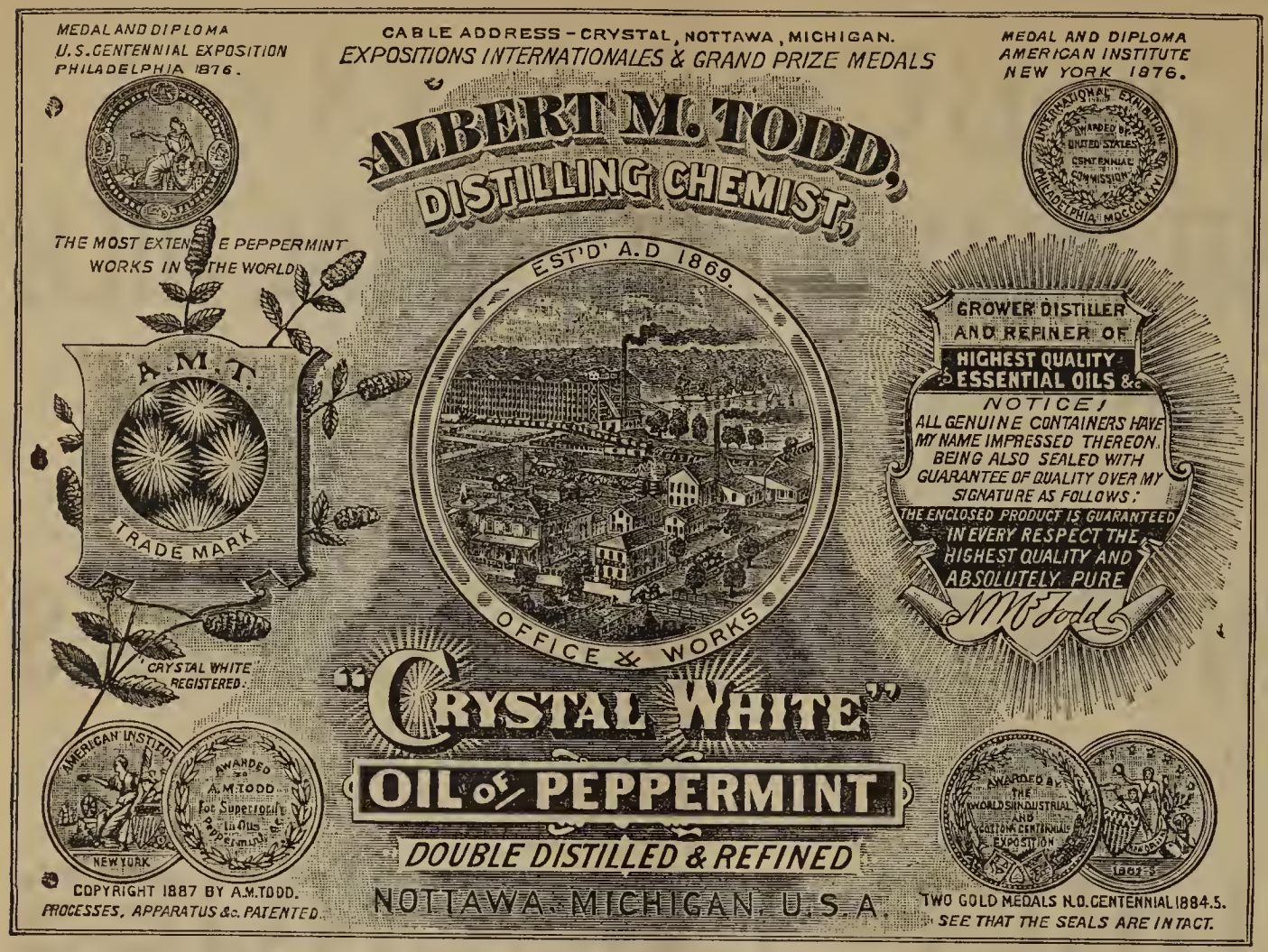

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The "**Crystal White**" **Double Refined** quality is **guaranteed positively** not only **absolutely pure, and in every respect the highest quality produced,** but also the **most economical,** less being required, while the highest results possible are quickly obtained.

SPECIAL AGENTS:

Burgoyne, Burbidges & Co., London; James Woolley, Sons & Co., Manchester.

MENTHOL CONES.

ACMÉ BRAND (Registered No. 38537).

Guaranteed Pure Japan Menthol. *The Cheapest and Best put up Cones in the Market.*

All our Boxwood Boxes may now be had with label printed directly on to the box. Buyer's own name put on at 1/6 gross extra. No charge for large quantities.

Latest Novelty.—No. 217 Glass Show Bottle, as No. 214, 3/3 per doz., the best and largest 6d. Cone made.

No.		Per doz.	Size.
88.	Hard Wood Boxes, Pedestal Shape	2/6	1/
89.	Nickel Screw Capped Bottles	4/6	1/
90.	,, ,, ,, ,, ...	3/8	9d.
92.	,, ,, ,, ,, ...	2/6	6d.
161.	Boxwood Boxes, Acorn Shape	4/2	1/
162.	,, ,, Pedestal Shape, Screw Lids ..	3/11	1/
163.	Vegetable Ivory, Acorn Shape	5/	1/
200.	Boxwood Boxes, Pedestal Shape	3/	6d.
201.	,, ,, Barrel Shape, Screw Lids ..	3/11	1/
201B.	,, ,, ,, ,, Extra Large Cone	5/10	1/
202.	,, ,, Bullet ,, ...	3/11	1/
203.	,, ,, Cone ,, ...	3/11	1/
204.	Vegetable Ivory, Castle Shape	5/10	1/

No.		Per doz.	Size.
205.	Boxwood Boxes, Cone Shape, each in box ..	3/3	6d.
206	,, ,, as No. 203, Large Size ..	4/8	1/
207.	,, ,, Draughtsman Shape	4/11	1/
208.	Vegetable Ivory ,, ,, ...	6/6	1/
210.	Boxwood Boxes, Acorns, Nickel Plated Caps ..	5/	1/
211.	Vegetable Ivory Boxes, Acorns, Nickel Plated Caps	5/10	1/
212.	Boxwood Boxes, Bullet Shape, reversible end	4/8	1/
213.	Menthol Charms for Watch Chains, &c. ..	2/8	6d.
214.	Glass Show Bottle, with Cone on Stopper ..	5/10	1/
216B.	Boxwood Boxes, Beer Bottle Shape, Large Cone	5/10	1/

209.—NICKEL PLATED PENCIL, WITH MENTHOL AT END, 1s. size, 4s. 6d. per doz.

A Sample Box containing one each of above, 6/-; by post, 7/-.

May be obtained through the Wholesale Houses at above prices. In ordering please quote numbers.

Cones supplied loose at lowest prices. Five per Cent. Discount for Cash with Order.

Special Quotations for large Quantities. *Manufactured only by*

HOCKIN, WILSON & CO., 38, Duke Street, Manchester Square, London, W.

Important Reduction in Prices.

"Tabloids" and "Tablets," [TRADE MARKS.] Compressed Chlor. Pot., etc.

Prepared by BURROUGHS, WELLCOME & Co., Snow Hill Buildings, London, E.C.

		Retail.	Per doz.
Potash Bicarb., 5 gr.,	Vinaigrette style (oval bottles, 30 in each)	6d.	4s. 6d.
,, ,, ,,	100 in bottle	1s. 6d.	12s. 6d.
Potash Chlorate ,,	Beautifully graven white metal boxes, blue silk label, 30 in each ...	6d.	4s.
,, ,, ,,	Vinaigrette style (oval bottles, 30 in each)	6d.	4s. 6d.
,, ,, ,,	100 in each	1s. 6d.	12s. 6d.
Potash Chlor. with Borax,	Beautifully graven white metal boxes, pink silk label, 30 in each ...	6d.	4s.
,, ,, ,,	Vinaigrette style (oval bottles, 30 in each)	6d.	4s. 6d.
,, ,, ,,	100 in each	1s. 6d.	12s. 6d.
Soda Bicarbonate, 5 gr.,	Vinaigrette style (oval bottles, 30 in each)	6d.	4s. 6d.
,, ,, ,,	100 in bottle	1s. 6d.	12s. 6d.

Reduced Prices of Quinine "Tabloids."

		Retail	Per doz.
Quinine Bisulphate, ½ gr.,	Vinaigrette style (oval bots., 50 in each) ...	1/0	8/0
,, ,, ,,	100 in bottle	1/6	12/0
,, ,,	1 gr., Vinaigrette style (oval bots., 36 in each) ...	1/0	8/0
,, ,,	1 gr., 100 in bottle	1/9	15/0
,, ,,	2 gr., Vinaigrette style (oval bots., 24 in each) ...	1/0	8/0
,, ,,	2 gr , 100 in bottle	2/9	24/0
,, ,,	3 gr., Vinaigrette style (oval bots., 24 in each) ...	1/6	12/0
,, ,,	3 gr., 100 in bottle	3/9	34/0
,, ,,	5 gr., Vinaigrette style (oval bots., 24 in each) ...	2/0	17/6
,, ,,	5 gr., 100 in bottle	5/6	50/0

SUBJECT TO THE USUAL DISCOUNT.

SNOW HILL BUILDINGS, E.C.
December 9th, 1887.

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ACID. ACETIC., B.P., ACID. ACETIC. 1·040. Guaranteed made from Soda.

PEROXIDE OF HYDROGEN, for Bleaching Feathers, Hair, Silk, Jute, Ivory, Bone, &c.

METHYLATED ETHER, 730 for Refrigerators, 717 for Anæsthesia.

PHOSPHORIC ACID CONCENTRATED, B.P. S.G. 1500, and Syrupy 1750.
Guaranteed Pure and Free from Arsenic.

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WITH VITRIFIED (burnt in) LABELS.

Black letters on White or Pink ground. Glass Drawer Labels to match.

NEW POISON BOTTLES, ribbed blue glass, with **raised** White vitrified letters and the word "Poison" in Red at foot.

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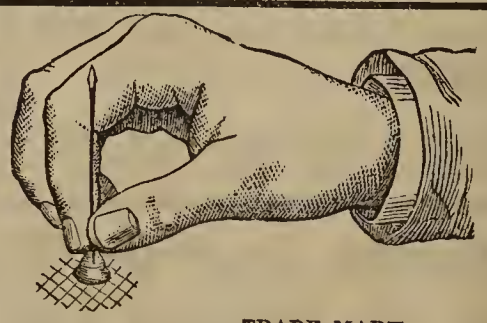
FLUID MAGNESIA.
Perfect in purity and uniform in strength.
The most efficacious antacid and mild aperient for delicate constitutions, ladies, children and infants.
Of all Wholesale Druggists.

Great Saving in the purchase
of New Medical Dispensing Bottles and Phials at the Islington Glass Bottle Company (H. HARRIS & CO., Proprietors), 153, Upper Thames Street, City, London, E.C.
Before ordering the above see our newly Reduced Price List, which is forwarded free on application; also for Blue Poison Bottles, Round Shouldered Phials, Castor Oil Bottles, Flat Panelled Bottles, Direct Square Dispensing Bottles, Citrate of Magnesia, Essence Bottles, Pomade Bottles, and all other kinds.
ESTABLISHED UPWARDS OF FIFTY YEARS.



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Tubes, 2*s.* each. Half Tubes, 1*s.* each. Pomade in vials, 5*s.*
HUMAN VACCINE, from healthy children only, microscopically examined and source quoted.—Three tubes, two-thirds full, 5*s.*; Tubes one-third full, and Lancet Charged Points, 1*s.* each; Pin-points, 1*s.* 1*d.* each. Eighteen Charged Small Points, 5*s.*
Tubes two-thirds full (same as those mentioned above, but without source), in quantities for export, £5 per 100 tubes.
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VACCINATIONS DAILY, between the hours of 12 *and* 2, *by the Consulting Physician, at the uniform fee of a Guinea.*
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N.B.—When ordering *indirectly*, please note that *all* our tins are embossed—"SAUNDERS."

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THE CHEAPEST AND BEST DISINFECTANT.
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FLUID MAGNESIA
The Original Preparation of the Inventor,
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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.
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Bottles, 1*s. and* 2*s. each.*
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STERN'S PUMILINE, after careful analysis by competent authorities, is proved to be the **Pure Essence** and the **Pure Extract** of the **Pumilio Pines** grown on the higher altitudes of the Alps in regions of perpetual snow, and an acknowledged remedy for **Gout, Rheumatism, Throat** and **Chest Affections.**

The system of Pine treatment for these ailments, in conformity with that so successfully carried out at Homburg, Ischl, Reichenhall, and at other Baths and Health-resorts on the Continent, has now for the first time been introduced into this country at the Hydro-Therapeutic Establishment at Farnborough, Hants. Baths and Inhalation Rooms have been erected for the special treatment by Pumilio Pine of patients suffering from Gout, Rheumatism, and Throat and Chest Affections; and this establishment is under the guidance and care of an able English Physician resident on the premises. **STERN'S PUMILINE** is the Pine Essence and Extract used at the Farnborough Establishment.

PUMILINE is much prescribed by German and Austrian Physicians, and has met with unvaried success. It has also been used in this country by Medical Men with equally good results, and is now freely prescribed.

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"I have carefully examined Messrs. G. & G. STERN'S **Pumiline**, or Pumilio Pine Essence and Extract, and find them, as represented, to be the pure products of the 'Pumilio Pine.'

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McK. & R.			DOZ. BOTTLES containing 25 PILLS.	DOZ. BOTTLES containing 100 PILLS.
Quinine,	Bi-Sulphate	¼ gr.	5/-	16/-
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,,	,,	4 gr.	13/-	48/-
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PILLS.			DOZ. BOTTLES containing 25 PILLS.	DOZ. BOTTLES containing 100 PILLS.
Quinine,	Sulphate	...¼ gr.	5/-	16/-
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A MONEY SAVING TEA. ABSOLUTELY PURE.

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Extr. Cin Choice Liq. (De Vry)

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MENTHOL CONES!!

QUALITY versus CHEAPNESS.

Buy only SHIRLEY'S BRAND, in the manufacture of which only the very best MENTHOL is used, grown in the richest soils of Japan. This is of *great importance*, if MENTHOL is to keep up its popularity.

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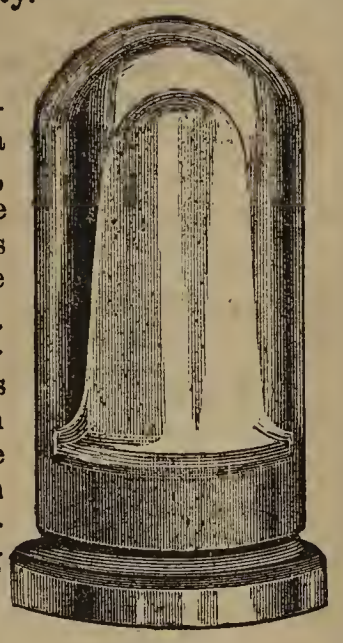

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Kay's New Transparent Cement for Broken Articles.

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Of LINSEED, ANISEED, SENEGA, SQUILL, TOLU, &c. (with Chlorodyne).

"The Stockport Remedy" for Coughs and Colds.

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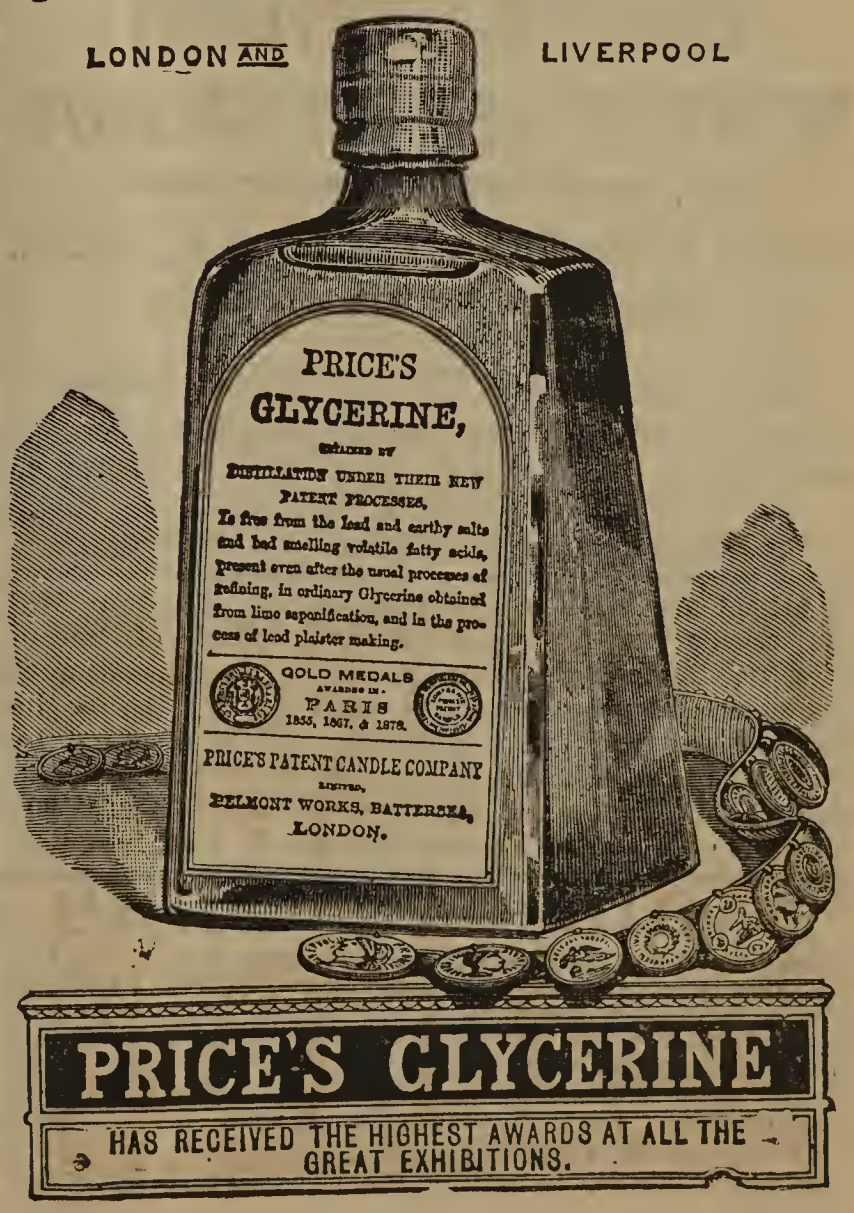

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5 sent in, **all passed**, viz.—

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„ G. J. KERR .....Liverpool.
„ H. MADDOCK .....Manchester.
„ J. W. WHITELY .....Gainsborough
„ F. H. WILKINSON .....Tranmere.

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2 sent in, **both passed**, viz.—

Mr. J. R. AMBLER .....Birkenhead.
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Mr. W. BENTLEY.....Egremont.
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„ T. W. CARR .....Knaresborough.
„ T. CLOUGH .....Liverpool.

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FOR immediate disposal (cheap), complete or in lots, Stock of Drugs, handsome Bottles, excellent Mahogany Fittings, also complete Case of Maw's Dental Instruments, electro. Apply, Mr. Anderson, 38, Tower St., Lynn, Norfolk.

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The Business conducted by Messrs. Orridge & Co. has been known as a Transfer Agency in the advertising columns of the Pharmaceutical Journal since the year 1846, and is well known to all the leading firms in the Trade.

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In Bottles, **2**s. **6**d.; Half Size, **1**s. **6**d.

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on : Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 913.] SATURDAY, DECEMBER 24, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

CHRISTMAS VACATION.

The Library and Museum in London will be closed from 5 p.m. on Friday, December 23rd, until 9 a.m. on Wednesday, December 28th, and will not be open in the Evening from Wednesday, December 28th, to Monday, January 2nd, both dates inclusive.

The Society's House in Edinburgh will be closed on Monday, December 26th, and also on Monday, January 2nd. It will not be open in the Evening from Tuesday, December 27th, to Friday, December 30th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself :—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

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PROFESSOR ATTFIELD.

DEMONSTRATOR—MR. F. W. SHORT.

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MR. E. M. HOLMES.

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MR. JOSEPH INCE.

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One Course (five months)	£2	2	0
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Application for admission to the School, for Prospectuses, or for further information, may be made, personally or by letter, to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

THE CHEMISTS

TWENTY-SECOND ANNUAL BALL

AT

WILLIS'S ROOMS, KING STREET, ST. JAMES'S

ON WEDNESDAY, JANUARY 18*th*, 1888.

Application for Tickets, *which must be accompanied by a Remittance, should be made to*
JOHN WILLIAM BOWEN, Hon. Secretary, 13, Curzon Street, Mayfair, W.

Attention is drawn to the following resolution of the Committee:—

"*That with a view to further secure the comfort of those present at the Ball, and to avoid the possibility of overcrowding, the number of tickets be limited to* 350; *and that all applications for tickets must be accompanied by a remittance.*"

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Including Refreshments, Supper, and Wine.

MR. DAN GODFREY'S BAND.

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3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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The "Sanitas" Company, Limited, *v.* George Condy.

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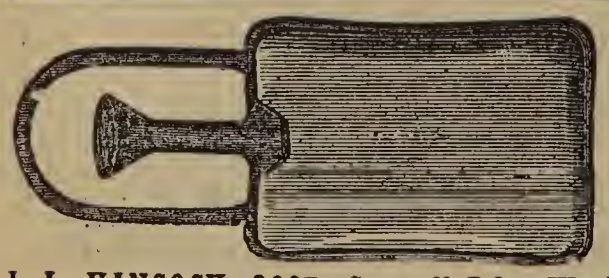

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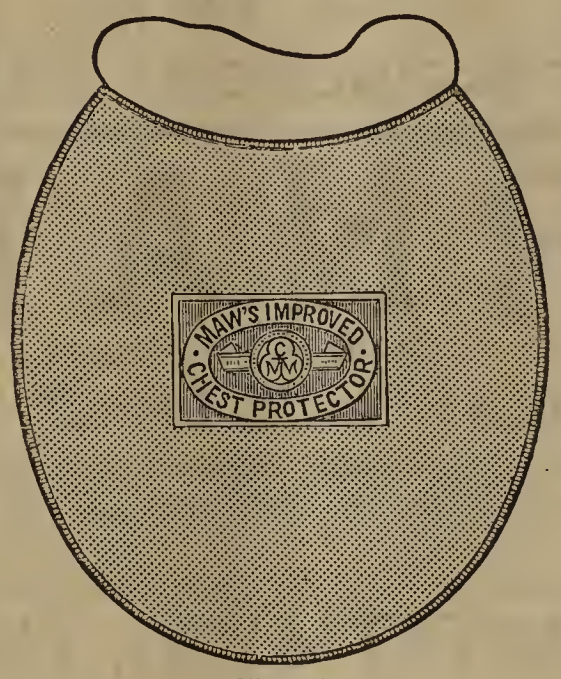

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Fig. 5. Vests ,,	,,	27/	34/	42/	51/

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A NOTE ON FERROUS HYPOPHOSPHITE AND SYRUP.

BY H. C. EVERSON.

Although not officinal ferrous hypophosphite and the syrup have been in common use for some years past, but as the general notions as to the character and properties of the preparations in use are somewhat vague, it occurred to me that a few experiments made with a view of clearing up the matter would not be entirely thrown away. Most authorities state that the solid hypophosphite in common use is ferrous hypophosphite, and describe it as being soluble in water, whereas exactly the opposite is the case.

If the powder of commerce is dissolved in hydrochloric acid, and tested with the ferro- and ferridcyanides of potassium, it will be found from the precipitates given to consist almost entirely of a ferric salt, and if treated with water to dissolve only to the extent of about 10 per cent.

Turning to Gmelin I found that he states that if metallic iron is dissolved in hypophosphorous acid without access of air, a solution of ferrous hypophosphite is the result, and if the solution is evaporated in vacuo a green mass of crystals is obtained. Having made such a solution I proceeded to evaporate it, but as commercially it would hardly be practicable to evaporate in vacuo, proceeded in the ordinary way in an open basin, taking care not to overheat the solution, till, at the finish, the result was not a green mass of crystals, but a whitish crystalline powder which, like the commercial samples, was almost insoluble in water, and consisted chiefly of a ferric salt; it burnt readily in the flame after the manner of hypophosphites. It was not soluble in hypophosphorous acid, but was so in some of the stronger acids, such as hydrochloric; but even this required the assistance of heat to completely effect its solution.

From this it would seem that the main product of the evaporation of ferrous hypophosphite solution in open vessels is ferric hypophosphite, and that it is not soluble, but almost insoluble in water.

The syrup of hypophosphite of iron, hitherto, has generally been made by dissolving the ordinary hypophosphite in concentrated phosphoric acid, and adding the solution to simple syrup; it gives a very presentable preparation, but is not a syrup of ferrous hypophosphite, but a syrup containing the ferric salt dissolved in phosphoric acid in syrup.

Recently the Unofficial Formulary Committee has published a form which is intended to give a syrup of the ferrous salt; this it does do, but the directions to effect the double decomposition in the cold, and to dissolve the sugar without heat, if followed, do not give a very satisfactory result.

The instructions to siphon off the syrup as required is hardly practicable, as the calcic sulphate resulting from the double decomposition is partially soluble in water, and deposits when the sugar is added to the solution of hypophosphite, and does not settle down so that it can be siphoned off, and to make the syrup presentable it has to be warmed and filtered.

A much better result might have been obtained by using instead, of the lime salt, baric hypophosphite, applying heat to effect the double decomposition, and filtering as rapidly as possible while hot on to the sugar, stirring till the sugar dissolved; such a syrup I have made with success for several years.

But since making these experiments it occurred to me that a much easier method of making this syrup might be adopted. Starting with the fact that metallic iron dissolved in hypophosphorous acid gives a solution of the ferrous salt, I took iron wire 49 grains, hypophosphorous acid sp. gr. 1·136 fl. ℥vi. (these are as nearly as possible the proportions to give theoretically, 160 grains of $Fe2PH_2O_2$), water fl. ℥ix., adding also the fl. ℥ii. of free acid ordered by the U.F.C., and boiled these in a small flask, the neck of which was closed by the nozzle of a small funnel to prevent evaporation and exposure, and on the iron being dissolved, filtering the solution hot on to 15 oz. of sugar (well broken up), stirring till the sugar dissolved; the result was a bright syrup containing 1 grain of $Fe2PH_2O_2$ to the fluid drachm, was free from the ferric salt (for potassic ferro cyanide only gave a very pale blue precipitate). The whole operation was effected in a very short space of time, and, moreover, the syrup has since kept perfectly bright in full bottles.

The formula therefore that I would recommend in future for making this syrup is as follows:—

Take—

Pure and fine iron wire.	49 grains.
Hypophosphorous acid, sp. gr. 1·136*	fl. ℥j.
Water.	fl. ℥ix.
Sugar (well broken up)	15 oz.
When complete to make fl. ℥xx. of syrup.	

Boil the iron wire in the mixture of acid and water till dissolved, filter hot on to the sugar, and stir till solution is effected.

I am much indebted to Messrs. Hopkin and Williams, in whose laboratory the foregoing experiments have been conducted.

CONTRIBUTIONS TO THE CHEMISTRY OF CINCHONA ALKALOIDS.†

BY O. HESSE.

I. *Critical Examination of the Optical Method of Determining Quinine and Cinchonidine.*—Some years ago I suggested that quinine might be determined in the presence of cinchonidine, by converting those bases in the mixture of cinchona alkaloids, obtained in the analysis of bark, into tartrates, and then observing the optical behaviour of these salts in an acid solution.‡ On making a more exact trial of this method, however, it became evident that the results thus obtained were not what might have been expected. At first I was disposed to ascribe the variation to the circumstance that solutions of the two alkaloids did not possess constant rotatory powers, and subsequently, when allowance had been made for this fact without removing the discrepancies in question, I came to the conclusion that it might be due to the more or less yellow colour of the tartrates obtained from the crude mixture of alkaloids.§ But while this disturbing condition does not obtain —in the case of the tartrates obtained in testing ordinary quinine sulphate—the results obtained by de Vrij‖ and Koppeschaar¶ in operating with such tartrate according to Oudemans'** method, are

* The acid should be free from lime.

† From Liebig's *Annalen*, ccxliii., 131.

‡ *Berichte d. deutsch. chem. Ges.*, iv., 693.

§ Liebig's *Annalen*, clxxxii., 153.

‖ *Pharmaceutical Record*, vii., 1886; *Chemist and Druggist*, 378, 1886.

¶ *Pharm. Journ.*, [3], xv., 809.

** Liebig's *Annalen*, clxxxii., 65.

in themselves especially calculated to make it evident, that even with perfectly colourless solutions, the difficulty still remains, and therefore to prove distinctly that the data obtained by the optical method are incorrect. As a matter of fact, it appears that in determinations by this method the amount of quinine is invariably too low.

The chief cause of this defect may be sought in the fact that the tartrates in question do not consist exclusively of a mixture of quinine and cinchonidine tartrates, as was assumed to be the case, but that they also contain, according to the material from which they may have been obtained, tartrates of hydroquinine and hydrocinchonidine, and perhaps other alkaloids as well, so that for the determination of the several alkaloids associated together one observation is insufficient. For instance, when hydroquinine and hydrocinchonidine are present, as in the tartrate obtained from some East Indian bark, three observations require to be made.

But quite independently of this complication there is another appreciable source of error attaching to the optical method, since the mixed tartrates precipitated by sodium or potassium tartrates cannot be placed on a level with the perfectly pure salts employed for determining the respective optical constants. In order to render them in this respect comparable with the latter, they would require to be recrystallized from boiling water, which cannot be done, because the relation between the bases would thus be sensibly altered. Moreover, the above mentioned constants differ according as they have been determined by different observers; and this circumstance shows that in the optical method of determination there must be other factors besides those which have been mentioned, which exercise an influence upon the results thus obtained. For example these constants have been determined as follow:—

With the concentration A.	Oudemans.	Kerner and Weller*	Hesse.†
For quinine tartrate . . .	−215.7°	216·3°	216·6°
For cinchonidine tartrate .	−131·3	132·8	134·6
With the concentration B.			
For quinine tartrate . . .	−211·5	−212·0	−212·5
For cinchonidine tartrate .	−129·6	−130·3	−132·0

Oudemans gives for A the mean of −215·3°, 215·6°, 215·8° and 216° incorrectly as −215·8°. But notwithstanding this error, he found the rotatory power of quinine in the control experiments on the average still higher by 0·57, so that this constant would have to be increased to −216·37°. It would then take its place between the values determined by Kerner and Weller and by myself. Then Oudemans found in one experiment, made to ascertain his constant, that $(\alpha)_D = -215{\cdot}3°$, and in a control experiment with the mixture of quinine and cinchonidine tartrates a rotatory power which amounted to −217·36°, for the quinine tartrate, making a difference of 2·06, and that by calculation would give 2·44 per cent. cinchonidine tartrate = ± 1·22 per cent. Hence it would follow that 1·22 per cent. cinchonidine tartrate might appear to be found in quinine tartrate that was absolutely pure, while another sample containing 1·22 per cent. cinchonidine tartrate might be taken as chemically pure.

The amount of water in the tartrates is of especial importance as regards the optical test; for if the salt contains hygroscopic water the deviation in the polariscope is too low, and if it should have lost water by efflorescence the deviation is too high. For example, if the hygroscopic water or the loss by efflorescence were to amount to 0·5 per cent., and if the value of $(\alpha)_D$, for the normal salts were = −200°, the corresponding values in those two cases would be −201° and −199°. These differences expressed as cinchonidine tartrate would lead in the one case to finding 1·18 per cent. too much cinchonidine tartrate, and in the other to finding as much too little.

According to Koppeschaar, these tartrates are stated to lose only hygroscopic water when exposed to the air at about 30° C., and not to lose any water of crystallization. He also states that cinchonidine tartrate when precipitated together with quinine tartrate contains, like that salt, only one molecule of water of crystallization, instead of two molecules. In the *Neues Handwörterbuch für Chemie*, 2549, I have given the formula of quinine tartrate as $(C_{20}H_{24}N_2O_2)_2C_4H_6O_6 + H_2O$ on the basis of Arppe's determinations. Oudemans subsequently confirmed that formula, but I have since found reasons to justify the conjecture that it is not really correct. In fact, a further examination of the salt has convinced me that its actual composition is represented by the formula $(C_{20}H_{24}N_2O_2)_2C_4H_6O_6 + 2H_2O$. One molecule of water of crystallization is given off readily at 120° C., but the other is not separated before the temperature is raised to about 140° C., as will be seen from the following data:—

			H_2O	Quinine.
1. 0·644 of the salt gave at	140° C.		0·027 and then	0·5007
2. 0·675	„	„	0·0265	
3. 0·3635	„	„	0·0148	
4. 0·3355	„	„	0·0138	
5. 0·308	„	„	0·0115	
6. 0·2947	„	„	0·1885 and	0·689 CO_2

Calculated for $(C_{20}H_{24}N_2O_2)_2C_4H_6O_6 + 2H_2O$.		Found.					
		1	2	3	4	5	6
$2H_2O$.	4·29	4·19	3·92	4·07	4·08	3·78	—
Quinine	77·69	77·74					—
C. . .	63·31						63·76
H . .	6·95						7·03

Since, therefore, quinine tartrate contains two molecules of water of crystallization, there is no danger that cinchonidine tartrate, when crystallizing with it, would be induced to combine with only one molecule of water. Koppeschaar's statement to the contrary is based upon the results obtained by him in drying the mixed tartrates at 120° to 130°, and he was of opinion that he had proved the statement to be correct by means of optical determinations. Nevertheless, such mixtures really contain two molecules of water of crystallization, and consequently the evidence put forward by Koppeschaar on the ground of the optical method has no other foundation than optical illusion.

In the preparation of the mixed tartrates, I made use of both cinchonidine hydrochlorate and quinine sulphate, and in some instances quinine hydrochlorate. These salts were dissolved in definite quantities in hot water and precipitated with Seignette salt.

A. 42·5 quinine tartrate and 57·5 cinchonidine tartrate.

I. 0·912 lost greater part of the water in the exsiccator, the remainder at 130° –135°, in all 0·044 H_2O.

B. 24·7 quinine tartrate and 75·3 cinchonidine tartrate.

II. 0·913 lost greater part of the water in the exsiccator, the remainder readily at 135°, in all 0·044 H_2O.

* *Archiv für Pharmacie*, 225, 118.
† *Pharm. Journ.*, [3], 16, 1025.

C. 13·2 quinine tartrate and 86·8 cinchonidine tartrate.

III. 0·361 lost at 120°–125° 0·0155 H_2O, and nothing more at 130°.

D. 84·4 quinine tartrate, and 15·6 cinchonidine tartrate.

IV. 0·5565 lost nothing in the exsiccator; at 120°–125° 0·012 H_2O, and at 140° 0·0117, in all 0·0237 H_2O.

	Calculated.				Found.			
	A	B	C	D	I.	II.	III.	IV.
H_2O	4·50	4·55	4·60	4·35,	4·82	4·81	4·28	4·25.

The circumstance that the mixed tartrates lose water of crystallization more rapidly than quinine tartrate, appears to indicate that in such mixtures the quinine tartrate is in combination with cinchonidine tartrate. Whenever the amount of quinine tartrate in the mixture exceeds about 33 per cent., a temperature of 120° to 130° is no longer sufficient to render the salt perfectly dry. This is also the reason that the mixed tartrates obtained in the analysis of many kinds of officinalis bark, and probably all succirubra bark, give up their water of crystallization almost completely at 20° in the exsiccator, while quinine tartrate itself does not at the utmost give up more than one molecule of water under the same conditions.

II. Compounds of Quinine with Cinchonidine.—The circumstance that de Vrij represented as pure cinchonidine the crystals obtained from ether in carrying out his bisulphate test, obviously with intention of making it appear that the quinine sulphate made under my direction contained a notable amount of cinchonidine sulphate, and thus casting suspicion upon its quality, has made it a necessity that I should give special attention to this matter.

On a previous occasion I had pointed out that under certain conditions the cinchonidine crystallized from ether might contain about one-third its weight of quinine, but at that time I was unable to say whether this admixture was chemically combined or only mechanically associated with the cinchonidine. The above-mentioned bisulphate test at length furnished me with the desired information in regard to that point, as I have shown in the *Pharmaceutical Journal.**

By operating with known quantities of cinchonidine sulphate I found that instead of obtaining the anticipated quantities of cinchonidine I obtained in eight experiments from 1·48 to 1·77 times as much, on the average 161 parts for 100 parts of cinchonidine taken. Those results showed clearly and definitely that, in the cases referred to, the crystalline substance obtained was at least for the most part a compound of cinchonidine with quinine. If the whole of the cinchonidine had been separated as a compound with quinine in the proportion of two molecules to one the quantity obtained should have been 155 parts for every 100 of cinchonidine actually present. For the most part rather more than that was obtained, because quinine not unfrequently adhered mechanically to the mass of crystals, especially when the quantity of cinchonidine was proportionately small, and the quantity of quinine in the mother liquor was large.

This compound of quinine and cinchonidine crystallizes in fine rhombohedrons, and therefore it was easy to pick out crystals that were sufficiently pure for analysis. The determinations made with that object were carried out by the optical method, and the results corresponded with the formula—

$$C_{20}H_{24}N_2O_2\,2C_{19}H_{22}N_2O.$$

	Calculated.	Found.		
Quinine . . .	35·56	35·6	35·4	36·2
Cinchonidine .	64·44	64·4	64·6	63·8

This compound forms brilliant rhombohedrons with a vitreous lustre; it dissolves very sparingly in ether, and apparently is still less soluble in ether containing quinine. By long treatment with boiling ether it is decomposed, with separation of another compound containing a larger amount of cinchonidine, while quinine and some cinchonidine are dissolved. When this compound is dissolved in hot dilute alcohol the solution on cooling deposits rhombohedrons which consist of the compound $C_{20}H_{24}N_2O_2\,7C_{19}H_{22}N_2O$.

	Calculated.	Found.
Quinine	13·6	13·7
Cinchonidine	86·4	86·3

This compound was meanwhile mentioned by Van der Sleen,* who had obtained it under other conditions. According to my opinion it corresponds with the cinchonidine sulphate of commerce.

It was especially interesting to trace out the compound $C_{20}H_{24}N_2O_2\,2C_{19}H_{22}N_2O$ in its combinations with acids, and to study its salts.

Neutral Sulphate.—The compound alkaloid was dissolved with dilute sulphuric acid, and the warm solution exactly neutralized with ammonia. On cooling, the neutral sulphate separated as long colourless needles, soluble in 167 parts of water at 15° C.

		H_2O.	$BaSO_4$.
I. .	0·564 gave at 120° C.	0·0825	0·1605
II. .	0·632 „ „	0·0925	

The analysis by the optical method gave—

Cinchonidine sulphate . .	64·8
Quinine sulphate	35·2

Calculated for $[(C_{20}H_{24}N_2O_2)_2SO_4H_2 + 8H_2O] + 2[(C_{19}H_{22}N_2O)_2SO_4H_2 + 6H_2O]$.

$(C_{20}H_{24}N_2O_2)_2SO_4H_2 + 8H_2O$	35·9
$2(C_{19}H_{22}N_2O)_2SO_4H_2 + 6H_2O$	64·1
$3SO_3$	9·68
$20H_2O$	14·53

	Found. I.	II.
$(C_{20}H_{24}N_2O_2)_2SO_4H_2 + 8H_2O$.	35·2	36·8
$2(C_{19}H_{22}N_2O)_2SO_4H_2 + 6H_2O$ . .	64·8	63·2
$3SO_3$	9·77	—
$20H_2O$	14·62	14·63

The amount of water of crystallization in both quantities of the salt prepared at different times dis-

* *Pharm. Journ.*, [3], xvii., 485. According to the directions given by de Vrij in reference to this test, five grams of the quinine sulphate is to be dissolved in 12 c.c. of normal sulphuric acid and the solution evaporated until a pelicle of crystals begins to form on the surface. That mode of operating proved to be unpractical, and, therefore, I have adopted as a modification the plan of pouring the solution without evaporation into a funnel closed at the bottom, and leaving it until the crystallization of the monosulphate took place. After some hours the stopper was removed from the lower end of the funnel, and the mother liquor drawn off. The crystals were then pressed together and washed with 3 c.c. of cold water added drop by drop. The mother liquor was then shaken with 16 c.c. of pure ether and 3 c.c. of ammonia solution of 0·960 sp. gr., and after standing for twenty-four hours the crystals deposited were collected. When the cinchonidine sulphate does not amount to more than 10 per cent. of the quinine sulphate operated upon, those crystals consist essentially of the compound $C_{20}H_{24}N_2O_2,2C_{19}H_{22}N_2O$. In my original directions for applying this test, I have recommended the use of ether of 0·721 to 0·728 sp. gr., but since then I have ascertained that in some instances such ether may retard the deposition of the cinchonidine compound.

* *De Indische Mercuur*, No. 5, 1887.

tinctly indicates that the quinine sulphate in this double salt has the eight molecules of water, which it also contains in a separate state. When the solution is highly concentrated dense brilliant needles are formed which appear to have a composition agreeing with the formula—

$(C_{20}H_{24}N_2O_2)_2SO_4H_2 + 2(C_{19}H_{22}N_2O)_2SO_4H_2 + 18H_2O$.

Crystals of this latter form are sometimes met with in preparing quinine sulphate from certain kinds of East Indian bark.

Neutral Tartrate.—This salt was prepared by precipitating a hot aqueous solution of the sulphate (1: 30) with excess of Seignette salt, and it was found to have a composition represented by the formula—

$(C_{20}H_{24}N_2O_2)_2C_4H_6O_6 + 2H_2O + 2(C_{19}H_{22}N_2O)_2C_4H_6O_6 + 2H_2O$.

0·6735 air-dried salt gave off at 120°-135° 0·029 H_2O.

A polarimetric determination with the concentration B gave $(\alpha)_D = -159·6°$.

	Calculated.	Found.
$6H_2O$	4·57	4·31
$2[(C_{19}H_{22}N_2O)_2C_4H_6O_6 + 2H_2O]$	66·6	65·70
$[(C_{20}H_{24}N_2O_2)_2C_4H_6O_6 + 2H_2O]$	33·4	34·3

Neutral Oxalate.—The salt was prepared from a solution of the sulphate (1 : 50) by precipitation with excess of potassium oxalate. It crystallized in long needles.

0·310 air-dried salt gave off at 120° 0·0405 H_2O.

A polarimetric determination with the tartrate prepared from this salt gave with the concentration A $(\alpha)_D = -181·6°$.

Hence it follows that the oxalate contains 57·2 per cent. $(C_{20}H_{24}N_2O_2)_2C_2H_4O_2 + 6H_2O$, and 42·8 per cent. $(C_{19}H_{22}N_2O)_2C_2H_4O_2 + 6H_2O$, corresponding to a molecular proportion of 5 : 4. Whether this relation between the two salts is in this case determined chiefly by a compound—

$$\left.\begin{matrix} C_{20}H_{24}N_2O_2 \\ C_{19}H_{22}N_2O \end{matrix}\right\} C_2H_4O_2 + 6H_2O$$

I must leave undecided. It is, however, a fact that in the precipitation of the oxalate an appreciable portion of the cinchonidine is separated, and remains in solution as a readily soluble oxalate.

Neutral Chromate.—When a hot aqueous solution of the sulphate (1 : 80) is mixed with neutral potassium chromate in excess the double chromate crystallizes out on cooling in long yellow silky needles. It is sparingly soluble in cold water, alcohol, and chloroform, and contains water of crystallization that is separable at the ordinary temperature in the exsiccator. By exposure to light the salt becomes dark coloured, and also by heating to about 80° C.

I. 0·3375 of the salt lost in the exsiccator 0·044 H_2O.

II. 0·5045 of the salt lost in the exsiccator 0·625 H_2O and 0·369 alkaloid.

III. 0·2622 of the salt lost in the exsiccator 0·034 H_2O and 0·5335 CO_2 and 0·1455 H_2O.

Calculated for $(C_{20}H_{24}N_2O_2)_2CrO_4H_2 + 2[(C_{19}H_{22}N_2O)_2CrO_4H_2] + 18H_2O$.

$18H_2O$	12·92
Alkaloids.	72·77
C	55·53
H	5·67

	Found. I.	II.	III.
$18H_2O$	13·03	12·38	12·97
Alkaloids	—	73·14	—
C.	—	—	55·64
H.	—	—	6·12

It follows from the foregoing data that in carrying out the so-called bisulphate test cinchonidine separates in combination with quinine, and that this relation between these two alkaloids of 1 quinine to 2 cinchonidine may continue to be maintained when they are combined with either tartaric, sulphuric or chromic acid to form neutral salts. I may, however, mention that this continued association in those proportions is directly determined by the concentration of the solutions, which may be due also to the presence of other salts, as, for example, in the case of the tartrate, by an excess of Seignette salt, in the case of the sulphate by ammonia sulphate, etc. That relative proportion is therefore maintained when the alkaloids are precipitated from a solution of the sulphate by an excess of any one of the precipitants, as tartrate or chromate, but it is at once altered when, for instance, the sulphate is recrystallized from boiling water.

In that case, a salt is separated that contains a larger amount of quinine than the one operated upon, while a corresponding quantity of cinchonidine is retained in the mother-liquor. This circumstance affords the possibility of obtaining quinine sulphate free from cinchonidine salt by recrystallizing sulphate containing only a small amount of cinchonidine, notwithstanding de Vrij's assertion that this cannot be done.

(*To be continued.*)

THE CHEMISTRY OF NITROGEN AS DISCLOSED IN THE CONSTITUTION OF THE ALKALOIDS.*

BY PROFESSOR DR. ALBERT B. PRESCOTT.

To the compounds of carbon chemistry has directed its main strength, since this science has had its maturity of purpose. In the work among organic compounds science has made its nearest approaches to an actual acquaintance with the molecule as a chemical centre. And from these advances every branch of chemical art receives full benefit.

Carbon was the first to gain attention as the member giving specific character to organic compounds. *Hydrogen* entered into the definition of organic chemistry at a later period. At the present *hydrocarbons* are represented to be the parent forms of chemical families, with carbon as the member for fixed position and hydrogen as the member for exchange. Upon these two elements, and upon their relations in the molecule, investigation has fixed its steadfast eyes in the will to divine the ways of chemical action.

Nitrogen comes next in turn as an organic element of importance. Hitherto, for the most part, organic nitrogen has been regarded only as a member peculiar to certain categories of carbon compounds. The name of nitrogen has not entered into any definition of general or commanding interest. Nevertheless, the *carbonaceous compounds of nitrogen* have already so appeared as to shed a good light upon chemical structure. It is hardly too much to say that in the study of these compounds lies before us the very organic chemistry of organic chemistry.

Through the inorganic world and its majestic round of supplies for the sustenance of living bodies, nitrogen has been noted as a unique element. The physiological availability of the free nitrogen of the air, long found a divided question, was well discussed in the last annual address before this section. The artificial conversion of atmospheric nitrogen into ammonia, an old attempt, is constantly urged at the hands of invention by new demands from the great chemical industries. The service of nitrogen in the explosives, fairly well under control in the use of projectile agents, is still in the need of improvements for safety and for rate of action. The element assumes strangely diverse relations ; it presents to us an enigma in physiology ; it leads in our estimates of the agricultural value of plant foods ; it stands in its

* Address before the Section of Chemistry of the American Association for the Advancement of Science.

indifference as an obstruction in the way of great chemical manufactures ; it keeps the post of a trusted agent for projectile force in arts of war and of peace ; it mocks us with its abundant presence in an inapproachable virgin state : the same element that holds the structure of the aniline dyes, and governs the constitution of the vegetable alkaloids. The character of nitrogen challenges chemical skill.

The chemistry of nature instructs the chemistry of art. Molecular synthesis wrought out in the vegetable kingdom, sometimes too complex for analysis, often too difficult to reproduce, always claim our study. And the reasons so far shadowed forth are more than enough to justify the attempt here entered upon, to trace back the path of attainment, and take the bearings of our progress, in the chemistry of nitrogen as disclosed in the structure of alkaloids.

The history and the present state of the constitution of the vegetable alkaloids, and other nitrogenous bases, may be outlined in the following order:—

1. The conception of the *type of ammonia* in the formation of nitrogenous bases. The light of this theory has enabled great numbers of artificial compounds to be produced, but for the most part it has failed to reveal the structure of the vegetable alkaloids.

2. The study of the *aromatic type* of structure in closed chains of six positions of carbon, conjoined with the ammonia type in side chains. Great numbers of new bases of amidobenzenoid constitution have been produced, while the benzenoid type has been found in but few of the vegetable alkaloids.

3. The demonstration of the *pyridine* and *quinoline aromatic groups*, holding nitrogen in position within the closed chain, in the constitution of numerous vegetable alkaloids. Already artificial production of both new and natural alkaloids follows up the discovery of the pyridine type of formation.

4. The researches upon *azo-* and *diazo-benzenoid bases*, in which nitrogen is linked to nitrogen in an open side chain of benzenoid molecules. Colour substances in abundance have been made upon these types, and a late announcement implies that the diazo structure takes part among animal decomposition products.

I. Nitrogenous Bases as Derivatives of Ammonia.

It was remarked by Liebig in 1830,* that the capacity for saturation of acids, possessed by the plant bases, was in proportion to the number of equivalents of nitrogen they contained. As early as 1837 Berzelius,† reasoning on the results of Regnault and Liebig, advanced the doctrine that the vegetable bases were conjugated compounds of ammonia—binary combinations in which the entire molecule of ammonia was united with a group or compound radical containing carbon—represented by H_3NX. The saturating power of the alkaloid was stated to be the same as that of the contained ammonia. Liebig departed from the doctrine of Berzelius to this extent, that he held the organic bases to be binary combinations, not of entire ammonia, but of amidogen, so that they were represented by H_2NX. Liebig's view looked toward but did not reach the idea of substitution for the hydrogen in ammonia‡. The doctrine of Berzelius as a whole "by no means met with general approbation, but," to use the words of Hofmann, "it was retained and carried out by Berzelius with the perseverance and ratiocination peculiar to that great chemist."

* Liebig, 1830–40: *Handwörterbuch der Chemie*, 699.

† Berzelius, 1837: *Lehrbuch der Chemie*, 5 Aufl., v. 15.

‡ In 1840 (*loc. cit.*) he made a remarkable prediction of the nature of the amines, obtained by Wurtz and by Hofmann ten years afterwards. "If," said Liebig, "we were able to replace by amidogen the oxides of methyl and ethyl, and of two basal radicals, we should without the slightest doubt obtain a series of compounds exhibiting a deportment similar in every respect to that of ammonia. Thus a compound of the formula $C_2H_5H_2N$ would be endowed with the properties of a base."

At the time of these studies vegetable alkaloids had been known in the chemical world for about twenty years. The chief bases of opium, cinchona, strychnos, veratrum, aconitum, and the solanaceous plants, had been obtained. The first distinct announcement of a plant base was that of morphine, by Sertuerner, in 1805, but this did not gain attention until Sertuerner's fuller report in 1817.* In 1803, however, Derosne† had obtained a "crystallizable opium salt" by two methods, one of which must have given him morphine, and the other, narcotine. In 1844 about fifty vegetable alkaloids were enumerated, including some whose identity has not been established.‡

The disadvantage incurred in investigation of organic bases under the Binary Theories of Berzelius and Liebig is shown by the difficulty described by A. W. Hofmann, in London, as late as 1849. "Vainly have I hoped in the course of my investigation on this subject," he says in conclusion of a paper on certain organic compounds of ammonia, "to cause aniline to split up into ammonia and the conjunct C_6H_4." The introduction of the Theory of Substitution, and the theory of Types by Dumas and Laurent, prepared the way soon after 1840 for the production of derivatives from ammonia.

(*To be continued.*)

A SUMMARY OF WALLACH'S WORK ON THE ESSENTIAL OILS.§

(*Concluded from page* 482.)

Wallach next proceeded to the investigation of some of the oxygenated constituents of essential oils and of those oxygenated substances that have been formed from terpenes. The first body examined was borneol, contained in Borneo camphor, from *Dryobalanops Camphora*.

Borneol $C_{10}H_{18}O$.—The method of preparation given by previous authors for borneol, consisting in reduction of ordinary (Japan) camphor with metallic sodium, was so modified that the production of borneol was effected easily and nearly quantitatively. It was then ascertained that the melting point of pure borneol was not, as had been previously given, 198°–199°, but 206°–207°. Borneol was found to behave generally as a saturated secondary alcohol, but it manifested the property of combining with bromine and the halogen hydrogen acids to form unstable double compounds, as $C_{10}H_{18}O.Br_2$; $(C_{10}H_{18}O)_2HBr$; $(C_{10}H_{18}O)_2HI$. Phosphorus chloride converted it easily into bornyl chloride, $C_{10}H_{17}Cl$, and this by heating with aniline was converted into solid camphene. The same camphene was formed under the influence of dehydrating agents from borneol direct ; but it could be isolated only when potassium bisulphate was used. When treated with zinc chloride, phosphoric anhydride, etc., and also by heat, solid camphene was decomposed, with the formation of liquid products, probably containing cymol. The substance that has been named "borneene" is therefore, according to Wallach, not an individual hydrocarbon, but a mixture of decomposition products of camphene. Subsequently, it having been established by comparison of bornyl chloride ($C_{10}H_{17}Cl$) with pinene hydrochloride that they were chemically distinct substances, the examination of turpentine oils was next proceeded with.

Turpentine Oils.—Wallach confirms the opinion expressed by Tilden several years ago (*Pharm. Journ.*, [3], viii., 448) that Russian and Swedish turpentine oil are similar in composition. They consist essentially of a mixture of pinene, sylvestrene and dipentene, with which also probably there is some terpin. The characteristic constituent of both is sylvestrene, discovered by Attenberg, which forms with hydrochloric acid a chloride ($C_{10}H_{18}Cl_2$) that melts at 72° ; it differs therefore from

* Gilbert's *Ann. der Phys.*, 1817, 57, 192 ; 59, 50.

† *Ann. de Chim.* (1) 45, 257. In Henry's 'Chemistry,' Phila., 1817, 'the narcotic principle of opium' is described in terms which apply to narcotine.

‡ Berzelius' 'Lehrbuch,' 4th and 5th ed., v., 1–315.

§ Abstract from a paper in the *Pharmaceutische Zeitung*, September 10 and October 15.

other terpenes. With bromine sylvestrene yields only liquid products. In further investigation of the oxygenated derivatives of turpentine oil it was found that a compound, $C_{20}H_{34}O$, reported to have been obtained by Wiggers and List, and named by them "terpinol," does not exist; but a liquid obtained as described by them proved to be a mixture of terpineol, $C_{10}H_{16}O$, and three hydrocarbons of the formula $C_{10}H_{16}$, terpinene, terpinolene and dipentene, together with a little cineol. Of these substances, terpinolene and terpinene represent typical terpenes.

From the general results of the investigation, of which the foregoing is necessarily only a very condensed *résumé*, Wallach considered it might be held as proved that one group of the terpenes, $C_{10}H_{16}$, is the first polymerization product of the fatty hydrocarbon C_5H_8, and that the same hydrocarbon may, by further polymerization, pass also into $C_{15}H_{24}$, $C_{20}H_{32}$, etc. A nearer examination of these sesquiterpenes and polyterpenes appeared therefore to be of special interest. The first business was to prepare an actually pure sesquiterpene. Such a one is contained in oil of cubebs, from which it was separated by passing hydrochloric acid gas into the oil to form the compound $C_{15}H_{24}\cdot 2HCl$ (m.p. 117°–118°) and decomposing this with aniline. The pure sesquiterpene distilled completely at 274°-275° and a determination of the vapour density gave the theoretical figures.

The same sesquiterpene was also found in the portion of patchouli oil boiling between 270° and 280°, and in the corresponding fraction of galbanum oil. The high prices of these oils made it necessary to seek a cheaper raw material, and this was eventually found in oil of savin and in oil of cade, the latter of which gave a good yield. In this case also the hydrochlorate was first prepared, but the separation of the hydrocarbon was found to be best effected by heating with anhydrous sodium acetate and glacial acetic acid. The sesquiterpene boiled between 274°–275°, had a sp. gr of 0·921 at 16°, and showed a great tendence to resinify. It also gave a colour reaction which appears to be peculiar to the terpene $C_{15}H_{24}$. Upon the addition of a few drops of strong sulphuric acid to a solution of the hydrocarbon in excess of chloroform, the chloroform first becomes intensely green, then blue, and upon warming the colour changes to red.

It would therefore appear that at present the following terpenes can be sharply distinguished one from another:—(1) pinene, (2) camphene, (3) limonene, (4) dipentene, (5) terpinolene, (6) sylvestrene, (7) terpinene, and (8) phellandrene.

(1) Pinene and (2) Camphene.

The only well-characterized pinene compounds are the so-called "artificial camphor," resulting from the addition of one molecule of hydrochloric acid to pinene, and probably the nitrosylchlorid addition product examined by Tilden. All the other compounds which were formerly spoken of as pinene derivatives are only formed after prior conversion into isomenes.

Camphene is best formed from pinene chloride by heating with dry sodium acetate and glacial acetic acid. The pinene is not, however, converted simply into camphene, but also into dipentene and its derivatives, and, further, into terpinolene and terpinene.

(3) Limonene

is strongly dextrogyre, and characterized especially by the formation of the tetrabromide melting at 104°–105°; but by addition of halogen hydrogen acids it is converted directly into dipentene derivatives.

(4) Dipentene

is formed by the superheating of isoprene, pinene, or limonene, and is therefore to be detected in all those oils containing terpene in the production of which a high temperature is used, as, for instance, in Russian and Swedish turpentine oils and caoutchin. But dipentene is also formed by the action of sulphuric acid upon pinene, or by the splitting off of water from terpin hydrate, terpineol and cineol. Dipentene hydrochlorate formed by the direct addition of hydrochloric acid to limonene and pinene, also by the action of hydrochloric acid upon terpin hydrate, terpineol and cineol. Probably also phellandrene and terpinolene may be converted into dipentine.

Characteristic combinations of dipentene are found in dipentene tetrabromide, melting at 125°–126°, and dipentene hydrochlorate, $C_{10}H_{16}\cdot 2HCl$, melting at 50°. Notwithstanding that dipentene is relatively stable, it may be inverted by means of alcoholic sulphuric acid or aqueous hydrochloric acid into terpinene.

(5) Terpinolene

is formed upon boiling terpin hydrate, terpineol or cineol with dilute acids (or phosphoric acid) and in the inversion of pinene with sulphuric acid. Its boiling point lies between 185° and 190°. The melting point of the characteristic tetrabromide is 116°. By the action of hydrochloric acid or other halogen-hydrogen acid it is converted into dipentene derivatives. Terpinolene appears also to be formed particularly abundantly in the treatment of cineol with sulphuric acid, and since in this reaction terpinene is also to be detected it may be that the terpinolene is thereby converted into terpinene.

(6) Sylvestrene

occurs in Swedish and in Russian turpentine oil, and forms a hydrochlorate ($C_{10}H_{16}\cdot 2HCl$) that melts at 72°, from which the hydrocarbon can be regenerated by means of aniline. If a small quantity of sylvestrene be dissolved in acetic acid or acetic anhydride and a drop of strong sulphuric acid or fuming nitric acid be added, the liquid assumes a magnificent blue colour. No other terpene shows this reaction, the isomeric compounds giving under the same conditions a red to yellow-red colour. Sylvestrene is one of the most stable of the terpenes; although it is polymerized when heated to 270°, it is not changed to isomeric modifications. It yields a characteristic tetrabromide that melts at 135°–136°.

(7) Terpinene.

This optically inactive hydrocarbon, which boils at 180°, and is very difficult to distinguish from dipentene, is formed upon heating terpin hydrate with dilute sulphuric acid, and can be obtained by treating pinene, dipentene, phellandrene and cineol with sulphuric acid. It is characterized by very readily yielding with nitrous acid terpinene nitrite ($C_{10}H_{16}\cdot N_2O_3$), which forms snow-white crystals that melt at 155°. By reduction it yields a base having an odour like naphthylamine, and which is volatile in the vapour of water. Terpinene is not readily inverted by sulphuric acid into another terpene, though it may undergo resinification.

(8) Phellandrene

was first found by Pecci in water fennel. It is dextrogyre, and gives with nitrous acid phellandrene nitrite ($C_{10}H_{16}\cdot N_2O_3$), which melts at 94° and is lævogyre. Phellandrene belongs to the instable terpenes, and can change into dipentene and terpinene.

As the outcome of this investigation it is claimed that eight distinctly defined terpenes have been described, affording a basis for the rectification of the nomenclature of the constituents of the essential oils. Moreover it has been demonstrated that the difficulty attending the investigation of this class of compounds, is dependent upon the complicated way in which these compounds change one into another. As to the practical use of such researches, it is pointed out that the observation that turpentine oil can be converted into the odorous hydrocarbon of orange peel, and the improved methods for the preparation of eucalyptol and borneol, have already acquired a commercial value. On the other hand most of the substances formerly credited with being the bearers of the particular odours have failed to justify the assumption. All that can be said at present is that the greater number of essential oils are substances differing but little in their physical and chemical properties, and that the different odours may be entirely due to small admixtures of other substances, which in respect to the terpenes are *quasi* impurities.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 24, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

A PLEA FOR PLANT-HUNTERS.

FOR a man to kick from beneath him the ladder by which he rose is in ordinary life considered to be a sufficient reason for the dethronement of the individual in question in popular esteem, if not in fact. To assume that in a single lifetime can be accomplished all the work essential to the complete development of a science is an error now too often perpetrated by some of our so-called advanced scientists. The full development of any science can only be accomplished by the self-sacrificing labours of numerous generations of experimenters, and by the application of deductive reasoning to the results of these experiments; join with these the application of the more subtle form of reasoning known as inductive, and we have all the elements necessary for the removal of any science from an empirical to an exact stage. Time is, however, here, as in all development, an important factor. It is first necessary to know the things themselves; if their more evident properties will enable us to classify them, so much the better for our chance of studying their more intimate structure and relations, and so much the better, therefore, for our chance of knowing their ultimate structure and position, and of inventing a system of classification which shall hold good for all time.

That this represents in skeleton the history of any of the natural sciences must be evident to all who, casting aside scholastic trammels, have ventured on the broader path of original thought and of original work. With this light, then, does it not seem at least ungrateful that some of us who profess to be students in the widest and truest sense should at times indulge in tirades against the men who, by the ceaseless study of external characters, were enabled to lay a foundation on which succeeding workers could build, and from which they could safely extend their building and improve its internal organization.

Such enormous masses of facts, the accumulation of which is so essential to the birth of classification, could never have been collected but for those unselfish labours which are the offspring of indomitable perseverance and innate enthusiasm. The enthusiasm which, on summer Saturdays and Sundays, sends troops of "plant hunters" and "butterfly catchers" into our fields and lanes, is of a like kind with that which sent LINNÆUS into all the countries of the globe, describing plants and animals as he found them, and of a like kind with that which led HUGH MILLER and TAM EDWARDS to prefer camping in a quarry or sleeping on a tombstone, to the home comforts which are responsible for the dignified idleness of so many. The perseverance which enables our "Scarabees" to collect such enormous piles of plants, of fossils, of butterflies or of beetles, differs in degree only from that which enabled DARWIN to drive home to the scientific world a theory which, but for the enormous masses of facts by which he enforced it, might have attracted as little attention as some of its merely speculative predecessors.

The botany of the old school was the study of the external characters of plants and the application of noted characteristics in the formation of a system whose members were connected by very obvious properties. The object of such a classification could only be the assistance of succeeding students by providing them with a dictionary of knowledge up to date, so saving them wasting time in going over old ground, and sometimes providing them with a key to phenomena which at times must have been inexplicable. The botany of the modern school is a science whose mainsprings are found in the words "ultimate structure," "function," "homology," "analogy." Let us not forget, however, that this "high level" botany is but a product of development; it could no more have sprung into existence without the botany of the "plant hunters" of last century than could a child become a man without having first experienced the weaknesses of adolescence. How can we expect to detect homologous and analogous organs in different species if we cannot recognize the species themselves?

There can be no doubt that histological and physiological methods are the instruments destined to introduce us to some of Nature's inmost secrets. They are also of undoubted value as educational instruments when used with discretion; but we must walk before we can hope to run, and just as the development of an individual is a type of the development of his race, so should the development of the principles of a science in the mind of a student be a repetition of the steps through which that science has passed in its journey from the depths of the unknown to the boundaries of the unknowable. This should be in itself a sufficient reason for making minute structure and function subservient to the study of external characters in the education of elementary students. The ball once set rolling will make a path for itself, "for nature never did betray the heart that loved her."

Cui bono is a cry which should never be raised without an intimate knowledge of the motives for and possible effects of the action in question. When we are tempted to describe the botanist of the old school as "an accumulation of a series of shelves of

mummified plants labelled with outlandish and savage names," we should first lay to heart the facts noted above, and the result will be more consistent with our position as links in the chain of development.

One word more in defence of the methods of the older botanists. Recently, Sir JOSEPH HOOPER has published in the *Annals of Botany* an elaborate monograph on a new genus of plants, all the data having been obtained from a herbarium specimen half a century old. In the plate accompanying the paper an illustration is given of the plant in its natural condition, as also drawings showing the anatomy of the various organs. In the same number Professor OLIVER, in concluding a research into the anatomy of two genera of seaweeds, expresses his surprise at the accuracy with which the systematists had placed these genera, his research into their minute structure entirely confirming the classification adopted on external evidence only. "I can but ascribe it," he says, "to that wonderful instinct for affinities pos-"sessed by great systematic botanists. As investiga-"tion into minute plant-anatomy is pushed further "and further, this characteristic of correctly guaging "the true systematic position of a plant from external "data only is repeatedly seen; thus, to give another "instance, SCOTT, in his investigations into the dis-"tribution of laticiferous tissue in Euphorbiaceæ "finds himself able to confirm on purely histological "grounds BENTHAM'S separation of certain tribes on "ordinary macroscopic data."

WHAT HAS THAT TO DO WITH PHARMACY?

AN American contemporary, in an article bearing this title, has some sensible remarks on the mistaken views of those who regard scientific subjects from the point of view indicated by this question. It points out that the superlatively practical druggist who looks with disgust upon all elaborate chemical equations, or the descriptions of some newly-discovered plants, and complains that pharmaceutical journals do not, in place of such matter, give good practical articles that would help them in their every-day work, can do so only because he fails to recognize the importance of keeping abreast of the progress of science. If the complaints and suggestions of such people were heeded it is the opinion of the writer of the article referred to that pharmacy would occupy but a limited field. If pharmacy were nothing more than shop-keeping, the remarks that are sometimes made about the uselessness of scientific knowledge might be pertinent. But it may be affirmed that it is really more than that and is widespreading in its relations. Men who make such objections do not consider the years of hard work with brain and hand, of experiment and investigation that have resulted in the pharmacopœias, dispensatories, and formularies. It is these results that make it possible for the man of narrow education and narrow-minded tendencies to engage in business. By their means his path is so clearly marked out that he can scarcely go astray. On the contrary, the pharmacist of broad education is not only able to appreciate and make useful new scientific results, but can control the quality of the drugs he buys, and extend the number of his own preparations so as to become a more valued and respected aid to the physician. Who can tell how many of the untried and almost unknown drugs of the present day may take as prominent a place as chloral and cocaine have done already? Not many years ago the self-styled practical druggist might have asked with regard to these substances, what have they to do with pharmacy? There is as little rational foundation for the question in regard to the daily occurring results of scientific investigation, and the sounder procedure would be to endeavour to widen the field of pharmaceutical study, so as to make pharmacy a profession as well as a trade.

We understand that a legacy of £25 to the Benevolent Fund, from the late Mr. Frederick Neith Hunter, of Durham, chemist and druggist, has been received through Mr. Sarsfield, the Society's Local Secretary at Durham.

* * *

In the recently published Statistical Abstract for the Colonies and other possessions of the United Kingdom are some data showing the rapid increase in the supply of cinchona bark from Ceylon. In 1872 the value of the bark exported amounted to £6009, and in 1880 it had risen to as much as £118,794, while in 1883 it reached £421,256, and in 1886 it amounted to £345,977. It must also be taken into account that the price of bark at the present time is not much more than one-fifth what it was during the earlier year of the produce in Ceylon. Within the same period the export of tea from Ceylon has risen from £987 to £403,942.

* * *

The next monthly meeting of the Midland Counties Chemists' Association, which will be held on Thursday evening, the 29th inst., at the Grand Hotel, Colmore Row, Birmingham, will take the form of a "Musical and Social Evening." It will not be premature to state also that the Seventeenth Annual Ball in connection with this Association will be held in the Town Hall, Birmingham, on Wednesday, January 18th, 1888. In previous years the Ball has been such a marked success that it has become necessary to limit the number of tickets to be issued; early application should therefore be made for them to the stewards or to the Honorary Secretaries, Messrs. C. Thompson and F. H. Alcock.

* * *

The following are among the probable arrangements for the Friday evening meetings of the Royal Institution before Easter next:—January 20, The Right Hon. Lord Rayleigh on "The Diffraction of Sound;" February 3, Mr. F. Crisp on "Ancient Microscopes;" March 2, Dr Tidy on "Poisons and Poisoning." Among the courses of lectures arranged for are the Christmas lectures adapted to a juvenile auditory, which are to be delivered by Sir Robert Ball, Royal Astronomer of Ireland, three lectures in March on "Microscopical Work" by the Rev. Dr. Dallinger, and seven lectures on "Experimental Optics" by Lord Rayleigh, commencing on January 21.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 15, 16, 20, 21 *and* 22, 1887.

Present on each day—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 15th and 20th on behalf of the Privy Council.

MAJOR EXAMINATION.

15*th.*—*Eight* candidates were examined. *Three* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Cowper, Joseph .....Penrith.
Dickson, John .. ..Dumfries.
Elsdon, Herbert William .....Wells.
Goodfellow, Edward .....Thrapston.
Metherell, John .....London.

16*th.*—*Nine* candidates were examined. *Three* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Milbank, Sydney Thomas .....Bishop Stortford.
Millard, Edgar James.....Derby.
Pérodeau, Edward George .....Plymouth.
Poole, Weston ....Newcastle, Staffs.
Shera, William Arthur .....Horncastle.
Sugden, Samuel .....Newchurch.

MINOR EXAMINATION.

15*th.*—*Twenty-six* candidates were examined. *Sixteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Austin, William Hosking .....Devonport.
Ayre, Henry ..... Darlington.
Beck, John Wilson .....Morecambe.
Bowden, Francis Henry .....Manchester.
Bowen, Frederick Tamerlane...Rye.
Brookes, Joseph .....Northwich.
Bulmer, Bethel.....Pickering.
Callam, William Eggleton .....Ilford.
Castle, John William .....Durham.
Curtis, Wallace Edward .....Hatch Beauchamp.

16*th.*—*Twenty-seven* candidates were examined. *Eleven* failed. The undermentioned *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, Henry Whitmore..... ...Colchester.
Batty, George Arthur .....Great Driffield.
Brooks, Henry James Robert...Oxford.
Casewell, Job Parry .....Market Drayton.
Chaston, Alfred Edward.....Winchester.
Coombes, George John .....Nottingham.
Cooper, John James.....Castletown.
Cuff, Joshua Harcombe .....London.
Davis, Charles ....Leamington.
Davison, Daniel .....Cromer.
Forster, John Robert .....Blyth.
Franklin, Alfred James .....Brighton.
Frayn, Alfred .....Stonehouse.
Gardner, Joseph Samuel.....Daventry.
Gibson, George Wood .....Whitby.
Green, Frederick .....London.

20*th.*—*Thirty-two* candidates were examined. *Sixteen* failed. The undermentioned *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Chaston, William Robert .....Norwich.
Cooper, Charles Thomas.....Southampton.
Davison, James Richardson ..Alnwick.
Dowling, Robert ....Reading.
Green, Walter .....Hendon.
Hampson, William ....Leigh.
Hersant, Milton .....London.
Hurn, Albert Joseph .....Bristol.
Hyslop, Henry Tattersall .....Stockport.
Keene, Bernard .....London.
Lovegrove, Wallis Sheffield ...Crawley.
Mackridge, William .....Barnsley.
Masterman, Francis John .....Driffield.
Mills, Charles Thomas .....Shipston-on-Stour.
Morgan, William John .....St. Clears.
Morris, David ....Kidwelly.

21*st.*—*Thirty-two* candidates were examined. *Twelve* failed. The undermentioned *twenty* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, John..... .....New Wingfield.
Jones, John Morgan .....Brechfa.
King, Lawrence William .....Hull.
Kingston, William Richard ...London.
Muskett, Frederick James.....Newport Pagnell.
Osborne, James .....Bridgwater.
Pain, Percy .....Cambridge.
Pattison, Sidney .....London.
Pennington, John Noble.....Ulverston.
Plews, Harry William.....Bedale.
Pond, William Ernest.....London.
Prior, James.....Dewsbury.
Ralph, William.....Nairn.
Rees, Colin Atkins .....Dartmouth.
Reynolds, Philip .....Spalding.
Roberts, James Frederick .....London.
Robson, Tom Wardhaugh ..... London.
Routley, Edwin Walter .....Bath.
Ryall, Frederick John .....Devonport.
Sandbrook, John .....Market Drayton.

22*nd.*—*Twenty-nine* candidates were examined. *Seventeen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hanson, Arthur .....Queensbury.
Saxby, Austin Clare .....Leominster.
Scobell, Herbert William .....London.
Smith, Edward Gibbs.....Walton-on-the-Naze.
Spry, Richard ... .London.
Stapleton, Frederick William...Shefford.
Theckston, James.....Ulverston.
U'Ren, William Condy .....Liskeard.
Watkinson, Edward Wade.....Bradford.
Weston, George .....Sleaford.
Wilcock, Fred Anderton .....Bradford.
Wilkinson, John Hy. Varley...Wakefield.

MODIFIED EXAMINATION.

15*th.*—*One* candidate was examined, and failed to pass.

PRELIMINARY EXAMINATION.

22*nd.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Irons, Thomas M. ....Dundee.
Kerr, Charles .....Dundee.
Palmer, Charles Nicholas ... ..Stokesley.
Pickering, Walter.....Darlington.
Reid, David Spied Clark .....Glasgow.
Roberts, Weston .....London.
Sanley, Edward Thompson.....Whitehaven.
Woolsey, Edward Butler .....Blofield.

Resolved—"That the Board desires to place on record its high appreciation of the valuable services rendered to the Society and to Pharmacy by Mr. John Samuel Linford during the long period he has been a member of the Board. His colleagues venture to express their regret at his retirement from among them, and their best wishes for his future health and happiness."

EVENING MEETING IN EDINBURGH.

The second evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Friday evening, December 16, at 8.30. Mr. John Nesbit, Portobello, in the chair.

The minutes of the last meeting were read and approved.

Apologies for absence were intimated from Mr. Daniel Frazer, Glasgow; Mr. Gibson, Leven; Dr. Inglis Clark and Messrs. Fraser, Gilmour and Lunan.

In the unavoidable absence of Mr. Gibson the Chairman called upon the Assistant-Secretary to read the following paper:—

Liq. Ferri Hypophosph. Comp. B.P.C.

BY ADAM GIBSON, F.C.S.

As the formula given in the Unofficial Formulary differs in some respects from that which I had the pleasure of submitting to this branch six years ago,* it may be expected that I should now say a few words regarding it.

It has already been pointed out by the Editor of the *Chemist and Druggist* that the Formulary Committee is undecided as to which is the better process for preparing ferrous hypophosphite, that by double decomposition with ferrous sulphate and calcium hypophosphite, or that by dissolving ferrous carbonate in hypophosphorous acid. It was the former process which I recommended in my paper, but there are important details which I advised, and which have not been incorporated in the formulary recipe for syr. ferri hypophosph., more especially for boiling the solutions. This, as I then showed, prevents the formation of sulphuretted hydrogen in the finished product.

In these circumstances, and with all deference to Mr. Conroy's favourable opinion of the method, I give preference to the second one, and I believe that the formula for liq. ferri hypophosph. co., may be considered a great improvement, although the proportions are not strictly in accordance with Churchill's.

It must also be said in its favour that as the new preparation has only a slight excess of free acid, it will not be so liable to deposit the salts as one containing such a large excess as Churchill's (1·66 per cent.).

This has been the great source of difficulty in the liquor, the acid supplying material for the conversion of the hypophosphorous into the higher salts, phosphites and phosphates.

The method recommended for obtaining ferrous carbonate is capable of some improvement. The form directs the decomposition of ferrous sulphate with sodium carbonate (it is silent as to whether hot or cold water is to be taken to dissolve them), and to wash the precipitate with sweetened water until the washings cease to give a precipitate with nitrate of barium. This excess of alkaline carbonate is quite unnecessary, and is very difficult to remove except by repeated washing and consequent exposure, so that oxidation of the precipitate is greatly favoured.

A better method would be to dissolve each salt in a quart of boiling water, mix the solutions, stir well, and let stand to cool and deposit, then wash with cold water twice by decantation. By this means the change is reduced to a minimum.

Mr. J. B. Stephenson said he had no practical experience of this particular liquor. He recollected that in his original communication Mr. Gibson directed the hypophosphites of iron, magnesium, and sodium to be prepared from the respective sulphates by double decomposition with calcium hypophosphite. In the B.P.C. formula the ready-made hypophosphites of calcium, magnesium, and sodium, were ordered, and the hypophosphite of iron was directed to be made by dissolving freshly precipitated ferrous carbonate in hypophosphorous acid. This seemed an improvement, and would prevent risk of precipitation by keeping out the calcium sulphate found in the liquor prepared by Mr. Gibson's process, and which was very apt to separate on standing.

Mr. Maben said he was pleased to find that Mr. Gibson did not condemn the B.P.C. formula, but seemed rather to think it was an improvement. With regard to Mr. Gibson's process for making all the hypophosphites by double decomposition, the objection to that was the inevitable presence of calcium sulphate in the resulting liquor, and it was to obviate this difficulty that the B.P.C. formula had been devised. The reason why ready-made hypophosphites of calcium, magnesium, and sodium were ordered was that these salts could be easily obtained commercially in a satisfactory condition. The ferrous hypophosphite was ordered to be made by dissolving freshly precipitated ferrous carbonate in hypophosphorous acid, because commercial ferrous hypophosphite was always more or less insoluble, and generally contained a proportion of ferric salt. Mr. Gibson was correct in saying that the liquor was not so strong as Churchill's, but the difference was intentional. He inferred from what Mr. Gibson said that Churchill's liquor always deposits, and he thought that was so, and the deposition could not be obviated. It had been suggested that this might be done by reducing the quantity of hypophosphorous acid to a small excess. Such a liquor keeps better, but deposition is not obviated. This deposit, does not, as is frequently supposed, consist principally of lime salts. He had examined several deposits, and these contained a considerable quantity of iron, probably as ferric hypophosphite and phosphite, with a trace of phosphate. The B.P.C. liquor keeps well. Mr. Conroy says it is a good liquor, but "deposits as all aqueous solutions of hypophosphites do." A pharmacist who had made the liquor informed him that it had not deposited at the end of two months, and if that were so it was satisfactory as regards the *modus operandi*. It would perhaps have been better had the Committee specified a definite quantity of water in which to dissolve the ferrous sulphate and sodium carbonate, and it would also probably have been an improvement to have directed boiling water to be used; the object to be aimed at was to have a dense precipitate which would wash rapidly. He quite agreed with Mr. Gibson that in this case washing by decantation was much to be preferred to washing on a filter. The slight excess of sodium carbonate ordered was not of much consequence, because if it were not entirely washed out it would simply form sodium hypophosphite. The real intention and difficulty was to get rid of the last traces of sodium sulphate.

The Chairman said he thought this formula was an improvement on the one formerly in general use. He had not worked with the B.P.C. formula, but had made the liquor by a very similar process, and found it much better than that made as proposed by Mr. Gibson.

Mr. Maben remarked that, of course, no finality was claimed for the B.P.C. formulæ, and the Committee would welcome any suggestions or improvements. It had been proposed by Mr. Martindale that all these liquors and syrups might be made by dissolving iron wire in hypophosphorous acid. He (Mr. Maben) had succeeded very well with this process; the principal objections to it being, the time required to effect solution, and the resulting liquor was too acid. Otherwise it was not unsatisfactory, and the feasibility of the process was being investigated at the present time.

The Chairman suggested that the iron wire might be dissolved first and carbonates of the other metals added to form hypophosphites with the excess of acid, and thus obviate the latter objection.

The following communication was then made on—

Emulsio Olei Morrhuæ B.P.C.

BY PETER BOA.

When the Conference Formula was published I prepared some of the emulsion strictly according to the

* *Pharmaceutical Journal*, [3], vol. xii., p. 603.

directions given. The result was not satisfactory. The globules of oil were visible to the naked eye, and when magnified 100 diameters they looked like peas. I tried various modifications of the process but without getting appreciably better results. When Mr. Conroy's suggestion to add a small quantity of acacia appeared I tried that. The division of the oil was finer. The globules were scarcely visible to the naked eye. Under a power of 100 diameters they appeared of various sizes, a considerable proportion being like turnip seed and others like corianders. This was better. On keeping, however, I found there was a greater tendency to separation, and signs of rancidity soon were apparent. The emulsion made strictly according to the B.P.C. formula showed no sign of rancidity. Gum acacia in powder, if rubbed with water, gives a strongly acid reaction; fresh mucilage is acid.

Tragacanth powder and freshly-made mucilage are only faintly acid. The strongly acid tendency of acacia may hasten rancidity in emulsions made with it. Acacia makes a very pretty emulsion, in which the oil is very minutely divided, and mixes readily with water. It is difficult to keep, however, and there is a suspicion that the gum is indigestible.

The B.P.C. formula has good points. The emulsion is easily made, inexpensive, and it keeps well.

When water is added to it the oil separates. This is probably an indication of how it will behave in the stomach.

Some years ago, after trying nearly every published formula, and a great many formulæ that have never been published, for emulsions with tragacanth, I reluctantly came to the conclusion that a really satisfactory emulsion could not be made by its means; and in this opinion I am more confirmed by my experience with the B.P.C. formula for emulsio olei morrhuæ.

Mr. C. F. Henry said he quite agreed with Mr. Boa that the B.P.C. preparation was not an emulsion and would not keep well. With regard to the making of oil emulsions, he had observed that the usual plan was to add the oil to the gum and then add the water. He did not approve of that method. His experience was that the best emulsion could be made by using acacia gum and making a mucilage first with the gum and water, and then adding the oil gradually. Operating in this way he had found it quite possible to make an emulsion containing 75 or even 80 per cent. of cod liver oil. By adding the oil to the gum and then the water, little lumps were apt to form. He could confirm Mr. Boa's statement as to the acidity of gum arabic, which was a serious objection to its use as an emulsifying agent. The difficulty with emulsions was the keeping of them. He had tried boric acid, but this was a point for further consideration.

Mr. Maben said the B.P.C. preparation was undoubtedly an emulsion, and it was very easily made and would keep without separating. He did not see why Mr. Henry should expect emulsions to keep more than a year; if they kept good that length of time they did very well. He was perfectly certain the B.P.C. emulsion would keep for twelve months, and that was about as much as could be reasonably expected of a cod liver oil emulsion. He did not understand Mr. Boa's objection to tragacanth. No doubt the particular formula might give an emulsion in which globules of oil were visible, but a splendid emulsion could be prepared with tragacanth, and the method suggested by Mr. Gilmour gave a very good result.

Mr. F. Stephenson said it had occurred to him that the addition of chloroform, presumably as a preservative, was wrong in principle, though the quantity in this case was so small as not to be any serious objection. He had frequently observed that camphorated oil kept well by itself; but when mixed with chloroform, in making linimentum chloroformi, bleaching soon took place and the oil became rancid. From this he inferred that chloroform had a tendency to induce rancidity in oils, and its addition, as a preservative, to a mixture containing oil was therefore apparently a mistake.

The Chairman said he concurred with Messrs. Boa and Henry in their criticism of the B.P.C. emulsion. He had never had any difficulty in making a good emulsion of cod liver oil with gum acacia, and he certainly thought it was superior to tragacanth.

The following paper was then read on—

Tinctura Quillaiæ, B.P.C.

BY PETER BOA.

In a preliminary note on this tincture, communicated to the junior Association which meets in this house, I expressed the opinion that the rectified spirit menstruum ordered in the B.P.C. Formulary for tincture of quillaia was not so suitable as a menstruum with a larger proportion of water for extracting the active principle of the bark.

For the sake of clearness I may briefly summarize the principal points in my previous communication.

I prepared three tinctures, one according to the B.P.C. formula with rectified spirit, and two others after the same manner, but with different menstrua; one with proof spirit, and the other with 3 parts rectified spirit and 7 parts water.

From a superficial comparison of the three tinctures by taste, emulsifying power with oils, and frothing capacity when diluted with water, I came to the conclusion that the rectified spirit tincture was inferior in activity to the others. A percolate obtained by running water equal to half the quantity of the original tincture through the marc from the B.P.C. formula gave evidences of considerable activity, showing that the bark had not been exhausted by the first menstruum; a percolate obtained in the same way from the proof spirit tincture residue gave but little indication of value.

Through the able and willing assistance of my friend, Mr. J. Rutherford Hill, I can now submit a more conclusive report as to the respective values of the three tinctures to which I have referred.

No. 1. B.P.C. tincture gave 0·70 per cent. extractive.

No. 2. Proof spirit tincture gave 2·5 per cent. extractive.

No. 3. Water 7, spirit 3, tincture gave 2·0 per cent. extractive.

The percolates from the marcs of the B.P.C. and proof spirit tinctures gave 2·16 and 0·80 per cent. respectively of extractive.

Ten c.c. of each tincture were boiled with HCl for two hours; the sapogenin was filtered out, carefully washed, dried and weighed; the glucose was volumetrically estimated by Fehling's solution, and the percentage of saponin calculated therefrom.

The following are the results :—

	Sapogenin.	Glucose.	Saponin.
No. 1 .	·11 per cent.	·471 per cent.	·773 per cent.
No. 2 .	·25 „	1·087 „	1·783 „
No. 3 .	·24 „	0·926 „	1·519 „

Ten c.c. of each of the residue percolates were treated in the same way, and the following results were obtained :—

	Sapogenin.	Glucose.	Saponin.
Rect. spt. residue percolate	0·20 p.c.	0·60 p.c.	0·985 p.c.
Proof „ „	trace „	0·025 „	0·041 „

The estimation of the percolates from the residues shows :—

1. That the proof spirit practically exhausts the bark.

2. That the percentage of saponin in the original rectified spirit tincture, and in the percolate from its marc, added together, gives a total according with the values of the other two tinctures.

3. That the rectified spirit only half exhausts the quantity of bark ordered in the B.P.C. formula.

In regard to the results obtained it may be said that,

although I consider them conclusive in so far as showing the comparative values of the tinctures is concerned, yet I hesitate to ask you to accept them as absolutely accurate in regard to the actual percentages. In estimating the sapogenin it is probable that some of it was washed away, but all three were treated alike, duplicate estimations giving concordant results ; and this was considered sufficiently satisfactory for comparative purposes.

The percentage of sapogenin obtained from the tinctures No. 2 and 3, corresponds with the percentage of saponin, stated by works of reference to be contained in quillaia bark. But the results obtained by volumetric estimation of the glucose indicate nearly double the percentage recorded by Christophson (Watt's 'Dict.', vol. viii., p. 1779). He obtained his results by estimating the quantity of sapogenin produced by decomposing saponin with hydrochloric acid. He got from 8·51 to 8·53 per cent. The percentage of sapogenin obtained from the proof spirit tincture indicates 8·13 per cent. of saponin in the bark used.

Assuming the sapogenin method to be accurate, the glucose estimations indicate too high results, but for comparative purposes they are not the less useful. The calculations were based on Rochleder's equation (Watt's 'Dict.,' vol. vi., page 1013)—

$$C_{32}H_{54}O_{18} + 2H_2O = C_{14}H_{22}O_2 + 3C_6H_{12}O_6.$$

No. 3 tincture has deposited slightly since it was made, the alcoholic strength being probably not sufficient to prevent fermentive or other change ; this may account for its yielding results a trifle less than No. 2.

It is evident that the tincture of quillaia of the B.P.C. Formulary is designed for use in the preparation of liquor picis carbonis. In view however of the increasing demand for tincture of quillaia for internal administration as an expectorant, it might be well, if I may make a suggestion, to construct the formula for liquor picis carbonis so as to include the tar bark and spirit together, and to have a tincture made with proof spirit for internal use.

The formula for liquor picis carbonis might be somewhat after this fashion :—

Purified coal tar . . . . . 4 ozs.
Quillaia bark in No. 20 powder . . . 1 oz.
(this being the quantity the spirit is capable of exhausting)
Rectified spirit . . . . . 1 pint.

Macerate the bark in the spirit with occasional agitation for twenty-four hours ; then pack in a percolator, and gradually pour upon it rectified spirit until 1 pint of tincture is obtained.

Digest the prepared coal-tar with the tincture thus made at a temperature of 120° F. for two days, allow to cool, and decant or filter.

For internal use a tincture made with 2 ozs. of bark to 1 pint of proof spirit would be much stronger than tincture of senega, B.P. The dose would be about from ½ a drachm to 1 drachm. It just occurs to me that tincture of quillaia has not had a fair chance to establish its reputation therapeutically, on account of its very probably having been generally prepared with rectified spirit.

The proof spirit tincture may be accepted as a preparation containing in a thoroughly reliable form all the activity of the bark.

Dr. Claud Muirhead (*Ed. Med. Journ.*, Jan., 1887) states that he has used a decoction of the bark. This no doubt would be fairly efficient. As a rule, however, it is well to avoid boiling where a glucoside is the active principle.

The tendency to change observed in No. 3 tincture may be taken as an indication that an aqueous preparation will quickly undergo alteration.

Mr. Dott said he had no practical experience of this tincture, but believed that Mr. Boa's criticism of the formula was justified. Some time ago he had made a series of experiments on senega root, and found that the active principle was practically insoluble in alcohol, and there could be no doubt that the same was true of the active principle of quillaia.

Dr. Stockman said an infusion or decoction of quillaia would be very soapy and inconveniently frothy, and on that account not a suitable preparation. He thought the proof tincture suggested by Mr. Boa would be a much better form.

Mr. Maben said there was internal evidence in the formula itself that this preparation was not intended for internal use, no dose being stated. It was intended simply for the preparation of the liquor picis carbonis. It would no doubt be possible to recast the liquor picis formula so as to include the quillaia, as suggested by Mr. Boa, and if it were desired he could quite believe that a proof spirit tincture would be better for internal use ; but it was obviously inadmissible for the purpose for which this tincture was intended. With regard to Mr. Boa's figures, he observed that the rectified spirit tincture yielded 0·7 per cent. of extractive, and was said to contain 0·773 per cent. of saponin. He could not see how the percentage of glucose could exceed the amount of extractive, and apparently, therefore, the figure for glucose was too high.

Mr. Hill said Mr. Maben had pointed out an apparent confirmation of the glucose determinations which he had not previously observed. The extractive from the rectified spirit tincture was nearly colourless, and apparently consisted almost entirely of saponin. Mr. Boa had stated that the glucose percentages were probably too high, though for comparative purposes quite satisfactory, but the calculated percentage of saponin in the rectified spirit tincture was only very slightly in excess of the percentage of extractive. Quillaia bark had been stated to contain sugar. If that were so it should have come out in the rectified spirit tincture, and would have materially altered the relationship of the figures, but it had not done so, and he thought the statement required examination. He had observed in evaporating the tinctures to determine the extractive that a precipitate formed after heating for some time. He was therefore inclined to think that decomposition of the active principle would take place in the preparation of a decoction.

The Chairman said he had observed considerable variation in the colour of commercial tinctures of quillaia. This he attributed to the use of a bark containing more or less of the outer coloured portion. The pale inner bark alone should be used. He agreed with Mr. Boa that there should be two tinctures. One made with rectified spirit for the preparation of liquor picis carbonis and the other made with proof spirit for internal use.

The next communication was a paper on—

Tinctura Iodi Decolorata, B.P.C.

BY J. RUTHERFORD HILL.

Some years ago, judging by the smell, I suspected that the so-called colourless tincture of iodine, made by treating an alcoholic solution of iodine with ammonia, contained iodoform, but did not verify the supposition by any investigation. The appearance of a formula for the preparation in the B.P.C. Formulary recalled the circumstance to my mind, and was the occasion of this note.

This preparation was first introduced by Sir J. Y. Simpson about 25 years ago. His original formula was, I believe :—

Tincture of Iodine E. Ph. . . . . 2 parts.
Solution of ammonia . . . . . 1 part.

There are a great many different formulæ in use, but I shall only now refer to the one. The B.P.C. formula is apparently that suggested by Dr. C. O. Curtman, of Missouri, in 1870 ('Year-Book,' 1870, p. 22), but it is ordered to be diluted with spirit, which reduces it to one-third of Curtman's strength. The Formulary Committee

appears to have desired to adopt an iodine strength approximating to that of the official tincture of iodine.

I found on inquiry that many who had made the tincture by the B.P.C. method complained that it was a very slow process, taking many days to complete, and my first object was to see if this objection could be overcome. I had always supposed that direct sunlight was the principal agent in promoting reaction, and this I find to be a very general impression. It occurred to me on reading the formula that heat, and not light, had most to do with it, and a rough preliminary trial gave convincing proof of the fact.

The B.P.C. Committee directs the liquid to be kept in a warm place till decolorized. By a warm place, I presume, a place ranging from 20° to 25° degrees C. is intended, and I, therefore, tried the following experiments :—

1. One-tenth of the Formulary quantities of iodine, spirit and ammonia, in accordance with the first stage in the process, were placed in a stoppered bottle, and kept at a temperature of about 24° C., but not exposed to direct sunlight.

2. One-tenth of the Formulary quantities of iodine and ammonia, as above, but adding the full quantity of spirit to make 2 ounces at once, were similarly kept at a temperature of about 24° C., and not exposed to direct sunlight.

3. A similar mixture to No. 1 was kept at the ordinary temperature of the laboratory, about 10° C., and exposed to direct sunlight.

4. A similar mixture to No. 2 was also kept at the ordinary temperature of the laboratory, and exposed to direct sunlight.

At the end of ninety hours No. 1 showed a considerable proportion of free iodine, while No. 2 indicated a mere trace. At the end of one hundred and twenty hours (five days) all free iodine had disappeared from No. 2, but No. 1 still contained some which did not altogether disappear till the end of one hundred and sixty-eight hours (seven days). Up to the present time, twenty-two days, Nos. 3 and 4 still contain considerable quantities of free iodine, but No. 4, containing the full quantity of spirit, is evidently losing colour more rapidly than No. 3.

These experiments prove that heat is the main agent in producing the change, and they also prove that there is no advantage gained by adding only a small proportion of spirit at first, as directed by the Committee, but on the contrary the addition of all the spirit at once gives a gain of two days in the time required.

Following up this idea as to the effect of heat, it occurred to me that the process might be materially shortened if a still higher temperature could be employed without loss of material. To test this point a similar mixture to No. 1 was placed in an accurately ground stoppered bottle, the stopper securely fastened, and the whole placed in a water-bath and kept at a temperature of 90° C., and, of course, in total darkness. At the end of thirty minutes all free iodine had disappeared, but the solution was still of a deep yellow colour. At the end of forty-five minutes the solution was of a similar tint to No. 1 at the end of seven days, and the process was therefore regarded as complete. A similar test with No. 2 gave practically the same result. It was found quite unnecessary to go through the preliminary operation of dissolving the iodine in the spirit by heat, then cooling and adding ammonia. All the ingredients were placed in the bottle at once, and in a few minutes solution was perfect. Indeed in any case the previous solution of the iodine seems unnecessary.

The quantity of ammonia in the formula is largely in excess of that required by theory to combine with the iodine, and the foregoing experiment was repeated with half the quantity of ammonia. At the end of seventy-five minutes all free iodine had disappeared, but the liquid was of a bright yellow colour and smelt very distinctly of iodoform. It did not, however, stain the skin, and could, therefore, be used for the same purposes as the Formulary tincture. This result is quite in accordance with ascertained facts. It is known that in a mixture of alcohol, iodine and fixed alkalies or ammonia the largest proportion of iodoform is produced when the iodine is slightly in excess, and that a considerable excess of alkali largely reduces the yield of iodoform.

On looking over the literature of the subject, I find there is a great variety of statements as to the reactions taking place in the production of this tincture, and I have made a few experiments to ascertain, if possible, what it really does contain.

Many authorities state that it contains iodide and iodate of ammonium. Darling (*Pharm. Journ.*, [3], vol. vii., p. 42), who has done most to clear up the subject and has published several notes thereon, was the first to determine the presence of iodoform, which he attributes to a reaction between hypoiodite of ammonium and alcohol, and he also throws doubt on the alleged presence of ammonium iodate, but does not, apparently, test the point. Hager ('Year Book,' 1873, p. 326) states that it contains triethylamine, iodide of ethyl, iodide of ammonium, alcohol and free ammonia. Wood and Bache ('U.S. Dispensatory,' p. 1509) state that it is a hydro-alcoholic solution of iodide of ammonium and free ammonia.

The following are the results of a few experiments: 10 c.c. of each of the following solutions were diluted with an equal quantity of water, and the iodoform washed out by agitation with chloroform. The chloroformic solution was allowed to evaporate spontaneously, leaving the iodoform in yellow crystalline scales, which were weighed with the following results :—

	Iodoform per cent.	Equivalent to iodine per cent.
No. 1	0·10	0·097
No. 2	0·10	0·097
No. 3	0·09	0·087
No. 4	0 35	0·338

No. 1 was the solution prepared according to the Formulary directions, and kept at 24° C. for seven days. No. 2 was the sample similarly treated for five days, but with all the spirit added at once. No. 3 was the sample prepared by heating No. 1 to a temperature of 90° C. for forty-five minutes. No. 4 was the sample similarly prepared with half the quantity of ammonia. I should say that the tinctures were not estimated when made, but after standing twenty-one days, and all of them were made up to the full B.P.C. measure with spirit where necessary. No. 3 was also estimated when freshly made and found to contain 2 per cent. of iodoform, showing a loss of 0·11 per cent. in twenty-one days. No doubt a much larger percentage of iodoform is produced, but subsequently destroyed by a further reaction between it and free ammonia, and this change appears to go on gradually till all the iodoform disappears.

The solution freed from iodoform was tested for iodate, but with a negative result. Indeed, if much iodate were formed it would be precipitated, as ammonium iodate is insoluble in spirit. A little of the solution was distilled and the distillate tested for iodide and iodine, but again with a negative result. Apparently, therefore, there is no iodide of ethyl present. These alleged constituents having been thus disposed of, a measured quantity of each solution was treated with nitrate of silver, the precipitated iodide of silver collected, washed, dried, and weighed. The following are the results obtained :—

	Iodide of silver per cent.	Equivalent to iodine per cent.
No. 1	5·4	2·92
No. 2	5·2	2·81
No. 3	5·4	2·92
No. 4	5·1	2·76

There seems little doubt that the above iodine exists as iodide of ammonium in the tincture, and, making allowance for experimental errors, the results of the two

foregoing series of estimations account for the whole of the iodine in the tincture. The theoretical percentage of iodine is 2·86, and the above results, calculated from iodoform and iodide of silver combined, give the following approximate percentages respectively :—3·01, 2·90, 3·00, and 3·09.

When the ammonia and iodine are first mixed, an explosive compound, the so-called iodide of nitrogen, is precipitated, but soon splits up again and dissolves. Disregarding this reaction, the steps of the process may be made clear by the following equations, which are not given as an exact representation of what is probably a more complicated reaction, but rather as an explanation of the results detailed above. Schönbein (Watts' 'Dictionary,' vol. iii., p. 297) has found that hypoiodite of ammonium is formed by the action of iodine on excess of ammonia. The reactions may, therefore, be represented as follows :—

1. Iodide and hypoiodite of ammonium are formed thus :—

$$6NH_4HO + 3I_2 = 3NH_4I. + 3NH_2IO + 3H_2O.$$

2. The hypoiodite reacts with the alcohol to form iodoform and iodide and formate of ammonium, thus :—

$$2C_2H_6O + 8NH_4IO = CHI_3 + 3NH_4CHO_2 + 5NH_4I + 4H_2O.$$

3. The iodoform reacts with the free ammonia to form iodide and formate of ammonium thus :—

$$CHI_3 + 4NH_4HO = 3NH_4I + NH_4CHO_2 + 2H_2O,$$

so that ultimately the tincture contains iodide and formate of ammonium, free ammonia and spirit.

As to the therapeutic value of the preparation I do not feel competent to give an opinion. Darling says its action depends on the iodoform present. I do not think that can be so, as the percentage of it is very small at any time, and in a sample which has been made some time it has entirely disappeared, as I have proved by a recent examination of some which had been made for several months. Martindale ('Extra Pharm.,' p. 218) says it is about the strength of the official tincture. If this means that the solution contains about the same percentage of combined iodine as the official tincture does of free iodine, it is correct. If it means that it is of about the same therapeutic strength it is entirely erroneous and misleading. It seems to be a very general impression on the part of medical practitioners who prescribe this preparation, that in doing so they are using a solution which will produce the specific counter-irritant action of free iodine. This is manifestly an error, although no doubt it has a slight counter-irritant action, but this is due I should say entirely to the free ammonia it contains. This leads me to my next point. The name of the preparation is surely a contradiction in terms. Iodine cannot be deprived of its colour without being chemically and physically changed, and therefore no tincture of iodine can be decolorized and remain a tincture of iodine. It would be as correct to call a solution of potassium iodide a colourless solution of iodine. It might be called liquor ammonii iodidi ammoniatus, and it might readily be prepared, without impairing its therapeutic value, by dissolving a definite quantity of iodide of ammonium in rectified spirit, adding a due proportion of ammonia, and if thought desirable, a little iodoform.*

Mr. Boa has brought under my notice an instance of one medical practitioner who seeks to attain the object in view in the use of this preparation without altogether losing the specific effect of free iodine. He prescribes a bottle containing tincture of iodine and another containing aromatic spirit of ammonia, and instructs his patient to paint on the iodine at night and sponge it off with the aromatic spirit of ammonia before going out next day. Mr. W. L. Howie informs me that he has frequent occasion to use tincture of iodine, and finds no difficulty in washing out the stain with ordinary toilet soap. I have tried the experiment and can confirm the statement as regards the stain produced by the official tincture, but that produced by the liniment is rather more persistent. This effect is due, doubtless, to the alkali present in the soap, and it has been observed that a mixture of soap liniment and iodine liniment becomes colourless.

* The name and method of preparation here suggested were accidentally omitted in reading the paper.

The Chairman said the title of this preparation was undoubtedly a misnomer. With regard to therapeutic action he thought it was probable that the iodide of ammonium would be absorbed through the skin and thus produce the effects of iodine. They were familiar with analogous preparations in the liniment and ointment of potassium iodide, the virtues of which were, no doubt, due to absorption of the iodide. He had also found that ammonium iodide was apt to decompose with liberation of free iodine when exposed to the air.

Dr. Stockman said he quite agreed with Mr. Hill that in prescribing colourless tincture of iodine medical practitioners were under the impression that it contained free iodine. He had himself imagined that to be so till to-night. The external application of potassium iodide was now a somewhat antiquated practice. It could only produce benefit by absorption, and the effects of an iodide could be much more efficiently obtained by internal administration. In applying the colourless tincture of iodine, no doubt a small quantity of ammonium iodide would be absorbed, but when one orders tincture of iodine to be applied, for instance, to strumous glands on the neck, ferrous iodide is generally administered internally, the tincture of iodine being applied simply as a counter-irritant, like ammonia or cantharides, and this object could not be accomplished by using a preparation containing no free iodine. As regards the washing out of the stain with ammonia, it must be borne in mind that the counter-irritant action of the iodine would be quite lost during the day. A better plan would be to paint the stain with rouge or some similar application.

Mr. J. B. Stephenson said he had had considerable practical experience in the making of colourless tincture of iodine, having prepared it regularly since it was originally prescribed by Sir J. Y. Simpson upwards of thirty years ago. The formula he adopted, however, contained a larger proportion of iodine than that ordered by the B.P.C. one and corresponded in strength with the old tinct. iodi, Ed. Ph. He could confirm Mr. Hill's statement that the freshly prepared tincture contained iodoform. He had frequently observed the peculiar smell, but it had not occurred to him that it was due to iodoform. He had also found that after standing for some time the iodoform entirely disappeared. He had always mixed the iodine, spirit and ammonia at once, and thought the instruction as to the previous solution of the iodine was quite unnecessary. He was also of opinion that both direct sunlight and heat had an effect in hastening the decoloration.

Mr. Boa said this preparation was largely used, and he did not think that would be so if it had no therapeutic value.

Mr. Maben said this preparation had been in use for the last twenty or thirty years, and was frequently prescribed by medical practitioners. It was desirable that pharmacists should adopt a uniform standard in making all preparations, and therefore he thought the Committee were fully justified in including this preparation in the formulary. He did not think it was the function of the pharmacist to say whether or not the preparation was a bad one therapeutically. That was the province of the medical practitioner, and the duty of the pharmacist was to supply what was ordered. He had had experience in making the colourless tincture by heating in a water-bath and found it to work well. Mr. Martindale's formula in the 'Extra Pharmacopœia' directed exposure to sunlight, but as this was impracticable in the winter

the Committee had decided to order it to be kept in a warm place.

The Chairman remarked that he thought the Committee was quite right in giving a formula. What he objected to was the name, which was misleading and ought to be changed.

Blaud's Pills.

A discussion then took place on the B.P.C formula for Blaud's pills.

Mr. J. B. Stephenson said his experience was that the old method of mixing the salts and beating them thoroughly together, without the addition of any excipient, gave an admirable pill mass. He thought the addition of glycerine and water was quite unnecessary. He had also found that gelatin coating hastened rather than retarded oxidation. On examining a gelatin-coated Blaud's pill it was found that wherever the mass came in contact with the gelatin coating it was quite red and unmistakably oxidized.

Mr. Boa said he had not tried the B.P.C. formula, being quite satisfied with his previous process, in which no glycerine was used. He had found that pills made with glycerine soon got spotted and unsightly.

Mr. Duncan said he thought the introduction of glycerine to this formula was a case of painting the lily. A gentleman who had made the B.P.C. pills informed him that the mass was very unsatisfactory and quite crumbly. He had not tried the B.P.C. formula, but a similar one suggested by Ince. He prepared the pills with and without glycerine, and on estimating the ferrous carbonate found a difference of only 1 per cent. in favour of those made with glycerine. He might take this opportunity of stating that the percentage he found in the glycerine pill mass was 17·9. The figures as published in the *Pharmaceutical Journal* appeared to show that the percentage of ferrous salt increased by keeping. That was a slip either on his part or that of the printer.

Mr. C. F. Henry said he had made the B.P.C. Blaud's pills three times, and with a very good result. He was afraid, however, that their keeping qualities might not be so good, because on examining some which had been made some time they appeared to have lost the fine green tint which the mass had at first.

Mr. Macgregor said his experience was that the B.P.C. formula was about as perfect as possible. His first attempt was a failure, but this he attributed to the pills having been placed in a stoppered bottle. He now kept them in boxes and with most satisfactory results. Judging from appearance merely the pills seemed to keep in good condition.

The Chairman said he did not approve of the addition of glycerine and water, which he regarded as unnecessary. He was in the habit of making the pills in accordance with the French Pharmacopœia, using Martindale's proportions of the ingredients, and he found the process very satisfactory. His objection to the B.P.C. formula was that it gave a mass which was too stiff and tough. He also found that the pills kept well when coated with tolu varnish.

Mr. Maben said the discussion had brought out a considerable variation of opinion as to the value of the new formula. No doubt the result might vary, a good mass being got one time and an unsatisfactory one the next, but that was not the fault of the formula. If a satisfactory result was got once, that was sufficient to prove that the process was a good one, and any failure must be attributed to faults of manipulation or other causes. It must also be borne in mind that carbonate of potassium varies considerably in its percentage of moisture, and if a sample containing more than the usual quantity is used the resulting mass would be too soft. The object in adding glycerine to the mass was to prevent oxidation, and that it did so had been proved by Mr. Duncan himelf. He could not see that there was any substantial objection to it. Of course if the carbonate of potassium were moist they were not compelled to add all the excipient. On the other hand, if the carbonate happened to be dry it might be necessary to add even more excipient. The other day one of his apprentices in making the pills added all the excipient, but the result was a crumbly, unworkable mass, due to this very fact. It was got into proper condition by adding a little glycerine of tragacanth, and the pills, though a little soft at first, turned out well, and were, he thought, the best batch of Blaud's pills he had ever made. As regarded their keeping qualities he had made an estimation of them the day before, ten days after they were made, with the result that they showed ferrous salt to the proportion of 1·03 grain of carbonate in each pill, the theoretical quantity being 1·04 grain. That was pretty satisfactory evidence that they did not rapidly deteriorate, but he admitted he had never obtained such good results before. The great objection to the process followed by Mr. Stephenson was that the pills became rapidly oxidized, and hence the necessity for adding glycerine.

Owing to the lateness of the hour it was resolved to adjourn the remainder of the general d scussion on the the B.P.C. Formulary till the next Evening Meeting.

On the motion of the Chairman, a unanimous vote of thanks was awarded to the gentlemen who had contributed papers.

Mr. Stephenson proposed a vote of thanks to the Chairman, which was passed with acclamation.

The meeting then adjourned.

At the close of the meeting those present had an opportunity of examining samples of all the B.P.C. Formulary preparations, and Mr. Boa showed samples of several cod liver oil emulsions under the microscope.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The evening meeting held on Wednesday, December 14, partook of a somewhat unusual character, and was essentially a "students' night."

The proceedings were commenced in the laboratory, where the many students who attended were enabled to satisfy their physical needs before being supplied with mental food, by refreshing themselves with coffee and buns provided by the Honorary Secretaries, who hold the opinion that an empty stomach is not an essential condition to the growth of the intellect.

An adjournment to the lecture room followed, and the chair was taken by Mr. Ellinor, an especial favourite with the embryo pharmacists in the district.

The minutes of the previous meeting having been read and confirmed, Mr. J. Humphrey, one of the Hon. Secs., announced the receipt of the *Pharmaceutical Journal*, the *Canadian Pharmaceutical Journal*, the *British and Colonial Druggist* and the *Magazine of Chemistry and Pharmacy* from the respective editors and publishers; also a specimen pod of "strophanthus" from Messrs. Burroughs, Wellcome and Co., some autograph copies of prescriptions from Messrs. Cubley and Preston, and a number of duplicate specimens from the Museum of the Pharmaceutical Society, kindly sent by Mr. E. M. Holmes, the Curator. He then expressed his regret at having to communicate the fact that the President, Mr. J. M. Furness, had tendered his resignation to the Council of the Society, and apologized for the unavoidable absence of Mr. Newsholme from the meeting.

Mr. Ellinor said he was very sorry to find that the members in business took so little interest in the proceedings of the Society. He was the only one of them present that evening, and he thought that, considering the position the Association had attained, it was most discreditable that the work should be allowed to devolve so entirely upon the younger men. However he im

pressed upon the associates that it was they who furnished the real mainspring of the concern, and that, so long as they attended, and encouraged those who organized the proceedings by their assistance and desire to benefit and advance themselves in their studies, the Association would be carried on successfully. Referring to the President's resignation, he said that he personally regretted that Mr. Furness should have felt it necessary to take such a step. He congratulated those present upon the programme that had been provided for them, and called upon Mr. J. C. Arnold, F.C.S., to address them upon the "Measurement of Starches."

This somewhat difficult subject was rendered very clear by Mr. Arnold's succinct remarks and his coloured diagrams, representing the appearance of the most important starches when viewed under the microscope by the aid of polarized light, left nothing to be desired by those who sought to comprehend the subject fully.

An interesting discussion followed, and Mr. Arnold was accorded a hearty vote of thanks.

A paper was then read on—

The Sudden Appearance and Gradual Extinction of Certain Species of Plants in Limited Areas.

BY G. A. GRIERSON.

In Wallace's 'Island Life' (p. 481) the following sentence occurs:—"It is a well-known fact that fresh surfaces of soil or rock, such as are presented by railway cuttings and embankments, often produce plants strange to the locality, which survive for a few years and then disappear as the normal vegetation gains strength and permanence." Mr. Wallace makes use of the fact to show how the flora of one district may spread into another at a very great distance, and yet leave no trace of its progress. He mentions it as probable that it is in this way the Scandinavian flora has reached the southern hemisphere. Mr. Wallace attempts no explanation of the fact, but contents himself with citing numerous instances proving conclusively that it is so.

We may therefore take it as an indisputable fact that plants do spring up in this way. In order to account for this apparently erratic distribution it will be necessary to give correct answer to two questions. (1) Whence come the seeds which give rise to these plants? (2) Why do the plants so originated gradually die out in the majority of cases? In answer to the first question, there are two possibilities: either the seeds pre-exist in the soil, but at too great a depth to germinate, and on the soil being turned over, as in the making of a ditch or railway cutting, this obstacle is removed, and we have a repetition of the flora of an earlier period; or the seeds are carried by the wind and germinate freely in the freshly-exposed earth, while those which fall on the surrounding over-crowded and comparatively exhausted soil meet with an early death. The second question has, I think, only one possible answer; the soil becomes exhausted of the constituents most suitable for the growth of that particular species; the species therefore becomes unfit to contend successfully with its better adapted neighbours, and consequently goes to the wall.

In the absence of conclusive experiments it is impossible to answer the first question with absolute certainty, and I would take the liberty of suggesting that some of our country pharmacists, who have the opportunity and the necessary leisure, should take the subject up and remove it from the regions of empiricism to those of certainty. The necessary experiments could easily be conducted on a well-exposed piece of land of moderate size, by turning over the soil in contiguous areas at different seasons, and by the judicious use of gauze and glass-work.

Confining our attention to the evidence before us, there is, at least, one test that must appear as crucial in settling the relative merits of the two theories. If the seeds are wind-borne, no soil which is turned over in spring will produce its crop of new plants until the following year, that is, until the plants of the same species in the neighbourhood have seeded. While in Lincolnshire during the present year, my attention was called to a case in which a ditch had been dug in the early spring, and in the same year a crop of thistles sprang up all along the newly-turned soil. Now, it is quite evident that any pre-existing thistles in the neighbourhood could not have been in seed at that time; indeed, they would scarcely have commenced to send up their stems. As a matter of fact, however, there were no thistles for a considerable distance round. In this case, then, the thistle seeds must have been buried in the soil.

Mr. A. Bennett, of Croydon, in a communication to Mr. Wallace, states that the first year after the railway from Yarmouth to Caistor in Norfolk was made the banks produced abundance of *Œnothera odorata* and *Delphinium ajacis* (the latter only known thirty miles off). The new introductions, however, gradually disappeared, giving way to the native plants. A similar phenomenon was noted by the same observer between Chesterton and Newmarket, in Cambridgshire, where *Stellaria media* and other annuals appeared in large patches, and in about three years disappeared. Neither *Delphinium* nor *Stellaria* has seeds which are likely to be carried by the wind. Mr. T. Kirk states that in Auckland the fiddle dock (*Rumex pulcher*) occurs in great abundance on the formation of new streets, etc., but soon becomes comparatively rare. He thinks it probable that it was one of the earliest plants naturalized there, but that it partially died out, its buried seeds retaining their vitality.

In a letter to the *Pharmaceutical Journal* of April 25, 1885, I called attention to the sudden appearance of an abundance of *Hyoscyamus niger* and *Sinapis alba* on the earth turned over in making a new road on the island of Inchkeith, in the Firth of Forth, and to the fact that they are now gradually dying out, the former having almost entirely disappeared. On making further inquiry into this case I find it gives greater probability to the buried seed theory than I at first supposed. On my first visit to the island the plants were in flower, and as the henbane only flowers in its second year I find from a comparison of dates that the first year's plants must have made their appearance in the year in which the road was made, thus rendering it improbable that the seeds were derived from the plants already in existence, and of which there were only one or two on the island. In a reply to that letter Mr. J. C. Shenstone mentions a case from his own experience which also tends to confirm the buried seed theory.

There need be little difficulty in accounting for the presence of dormant seeds in the soil. Let it be granted that at one time some given species were common in a district; through the exhaustion of the soil, however, they gradually died out, that is, each year a smaller number of plants appeared. This could only have arisen from the fact that a smaller number of seeds germinated; there would, therefore, be left a large number of seeds capable of germinating, and only waiting for suitable conditions to enable them to do so. Most of the seeds which did not germinate, and remained at the surface, would undergo the ordinary process of decay. Many, however, would find their way to greater depths, some of them being washed down by water, others, and I think the greater number, would fall into the numerous cracks which are found on most lands after continued dry weather, a not uncommon condition in autumn. The mere fact that this cracking process takes place most abundantly in the fruiting season renders this hypothesis, at least, highly probable. On the return of wet weather the cracks would close up, and the seeds would be preserved until the soil was turned over. Their germination would be prevented by the exclusion of air and light, and for the same reason they would not undergo decay. One difficulty is, that under ordinary conditions seeds only retain their power of germinating fo

limited periods, but under the conditions which hold here, I think it not by any means improbable that they will retain their vitality for much longer periods.

Even if it were admitted that most cases of the phenomenal appearance of plants on newly turned soil were to be traced to dormant seeds derived from an earlier flora, it does not follow that in certain cases there are not other causes at work. For instance, seeds may be brought at times by animals and by the wind, and would naturally germinate more vigorously on fresh than on crowded soil, but I think such cases are exceptional. One very remarkable case of the agency of the latter is, however, found in a species of *Senecio*, known in Tasmania as "fire-weed." This plant makes its appearance on patches of land that have been cleared by fire, and on those patches only. Mr. Wallace mentions a case in which a burnt patch, thirty-five miles into the virgin forest, and consequently this distance from the nearest *Senecio*, immediately produced its crop of fire-weed.

In the discussion that followed, several speakers referred to cases in point, and Mr. R. Watts brought down the house by a humorous address, in the course of which he suggested that navvies might afford considerable assistance to nature by neglecting to clean their shovels, and so transferring different seeds from one district to another along with the adherent soil.

In his reply, Mr. Grierson accepted this suggestion as likely to be of some value.

After the usual vote of thanks Mr. Thos. Dobb explained a new and simple method of estimating peroxide of hydrogen. This consists in the use of a standard solution of potassium permanganate, which is to be added to an acidified solution of the peroxide. A caution was given against the use of commercial sulphuric acid in the process, for, probably owing to the presence of arsenious compounds, the results were thus rendered very misleading.

The subject having been discussed and Mr. Dobb thanked, the students took advantage of the show of microscopes and objects (kindly lent by Mr. Newsholme) which had been selected to elucidate points of interest to pharmacists.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The members of this Association held their annual dinner on Thursday evening, Dec. 15, at the George Hotel, Haymarket. Councillor J. G. F. Richardson, J.P. (President of the Association), occupied the chair, and Mr. Young the vice-chair.

After dinner Mr. W. C. Clark, in fitting terms, proposed "The Pharmaceutical Society of Great Britain."

The Chairman, as a member of the Council of the Society, responded, stating that the efforts of the Society had always been to further trade interests and ensure the safety of the public. Reviewing the provisions of the Pharmacy Act, he protested against the existing condition of things, whereby a most unfair distinction was made between a company and an individual, as regards the sale of drugs, so that a number of persons banded together—although unqualified—were enabled to do what a single person was not allowed to do. He hoped, however, that before long a new Act would be passed, and pharmacy take its proper place as a scientific business.

Mr. Thurlby submitted "The Leicester and Leicestershire Chemists' Association." Having referred in terms of the highest praise to the energetic services of the Hon. Secretary, he spoke of the value of the lectures held in connection with the Association by Mr. Burford, and to the valuable assistance of the Rev. J. Went and Mr. Poyser, adding that, with such facilities in their power of acquiring knowledge, he trusted the members of the Association would soon be able to proceed straight from Leicester to London to sit for their examinations. He referred also to the fact that the Association was financially sound, and appeared to have a bright future before it.

Mr. J. Edwards (Hon. Sec.), in responding, spoke of the success that had attended the scientific classes held under the auspices of the Association, stating that the members of the classes were in every sense a credit to the Association.

Mr. Woolley gave "The Town and Trade of Leicester." He said during the last few years the local "trade" had received a few "hard knocks" and a nasty dose of physic, owing to the action of the stores, but as the chemists had right on their side they had only to work hard and consistently to ensure success.

The Vice-Chairman responded in a facetious speech.

Mr. Burford gave "The Visitors," coupled with the name of Mr. J. Burn, who returned thanks.

Mr. Butler submitted "The Health of the Chairman," referring to his valuable services not only as a member of the Corporation, but as a representative on the Council of the Pharmaceutical Society, a manufacturing chemist, and as president of the Leicester Association.

The President, in returning thanks, again expressed a hope that the pharmaceutical classes of the Association would continue to flourish. With a view of promoting this object he had pleasure in offering £5 per annum to be distributed in prizes, and he hoped by personal effort to considerably increase this modest nucleus by other subscriptions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual dinner of the Nottingham and Notts Chemists' Association was held at the Masonic Hall. The President of the Association, Councillor Fitzhugh, J.P., occupied the chair. Mr. W. J. Rogerson, Vice-President, and Mr. W. J. Parker, Treasurer, were in the vice-chairs.

The Chairman having proposed the usual loyal toasts,—

Mr. S. V. Holgate gave the toast of "The Pharmaceutical Society." He believed that the Society had done a good work, only it was a great many years ago. For several years it had appeared to be in a state of quiescence, but perhaps that was a sort of calm which preceded a period of activity. He hoped that might be so, and that when the Society did commence work again as a result some benefit might be conferred upon the chemists of the country.

Mr. Parker, in replying to the toast, admitted that in his opinion the Pharmaceutical Society was established for a purpose very different from that which it now appeared to carry out. It was formerly established for the protection of the trade, but now it seemed to have carried out a programme to such an extent that trade matters appeared to be ignored, and the higher branches of scientific education were dealt with. He hoped that something more substantial would be done in the interests of the trade than had been done hitherto.

Professor Clowes proposed the "Nottingham and Notts Chemists' Association." He remarked that the Association was doing, and had done, good and important work in the past. The members were banded together for ensuring their apprentices a satisfactory course of training, and which, before the college in Nottingham was started, they themselves were carrying on in a satisfactory manner. The college had since maintained the work which the teachers were formerly doing. He thanked those gentlemen who had so thoroughly supported him thoughout in his work at the college, and coupled with the toast the name of their President and Mr. Widdowson, the Hon. Sec.

The President, in response, remarked that the Association had never been in a more satisfactory position than it was at present. There were as many members as ever, and more associates, and certainly the work they

did was better. Perhaps among themselves as members they were not doing quite so much, but he supposed that since they had stopped the monthly meetings they had felt themselves to be so learned that they considered it unnecessary to attend. It was, however, satisfactory to know that they were giving more instruction to the younger members of the rising generation. The Association now contained fifty or sixty members, and there were thirty-two associates, thirty of whom were attending the chemistry classes.

Mr. W. Widdowson also responded to the toast.

Mr. C. A. Bolton gave the toast of the "Professors and Instructors." He observed that chemists as a trade fully appreciated the opportunities given to them by being enabled to send the students of their establishments to the professional staff of the University College. He coupled with the toast the names of Professor Clowes and Dr. Haydn White.

Professor Clowes and Dr. Haydn White replied to the toast, the last-named gentleman holding that chemists were undoubtedly a profession rather than a trade, and should be recognized by law as such; they should also have some protection with regard to their right to sell pharmaceutical preparations and patent medicines as a profession.

Parliamentary and Law Proceedings.

Prosecutions under the Pharmacy Act.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* HALL.

At the Leigh County Court on the 16th inst., the Council of the Pharmaceutical Society of Great Britain sued Robert Hall, of 17, Chapel Street, Bedford Leigh, to recover a penalty of £5 for selling or keeping an open shop for the sale of poison, and a further penalty of £5 for taking, using or exhibiting the title of "chemist," contrary to the provisions of the Pharmacy Act.

Mr. Pickford, barrister, appeared for the plaintiffs. Mr. Hope appeared for the defendant.

Defendant's solicitor admitting the offences, judgment was entered for the two penalties sued for and costs.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* DENHAM.

At the County Court, Burton-on-Trent, on the 15th inst., before His Honor Judge Woodforde, the Council of the Pharmaceutical Society of Great Britain sued W. R. Denham, of Lichfield Street, Burton-on-Trent, to recover two penalties of £5 each, under sec. 15 of the Pharmacy Act, 1868, viz., for keeping open shop for the sale of poison, and for taking, using or exhibiting the name or title of "chemist."

Mr C. W. Langley Flux (Flux, Son and Co.) appeared for the plaintiffs. Mr. Smallwood appeared for the defendant.

Upon the case being called on, defendant's solicitor admitted the offences, and his honor entered judgment for the two penalties sued for with costs.

Obituary.

Notice has been received of the death of the following:—

On the 12th of September, of consumption, whilst on a voyage to Australia, Mr. Henry Judd, Chemist and Druggist, late of Regent Square, London. Mr. Judd was an Associate of the Pharmaceutical Society.

On the 22nd of November, after a short illness from bilious fever, terminating in apoplexy, Mr. William Fresson, of the firm of Scott and Co., chemists, George Town, Demarara. Aged 56 years. Mr. Fresson went to Demerara in 1861, under an engagement to the firm to whose business he eventually succeeded. Last year he was an exhibitor in the Colonial Exhibition, at the close of which he presented his exhibits to the museum of the Pharmaceutical Society.

On the 10th of November, Mr. James Wallace, Chemist and Druggist, Wombwell, near Barnsley. Aged 43 years.

On the 14th of November, Mr. Robert Stenhouse, Chemist and Druggist, Arlington Street, Glasgow. Aged 53 years. Mr. Stenhouse was formerly an Assistant Secretary to the Pharmaceutical Society.

On the 16th of November, Mr. Oswald Richard Cary, Chemist and Druggist, Oldham Road, Miles Platting, Manchester. Aged 43 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Cultivated Ipecacuanha.

Sir,—The following report, given to me by Mr. Hare, F.R.C.S.E., of Edinburgh, respecting the therapeutic action of the specimen of cultivated ipecacuanha which formed the subject of a note read at the Evening Meeting in November may be of interest as confirming the results then recorded.

"I have tested the action of the Indian ipecacuanha fully in one case, comparing it with the ordinary powdered root of the Pharmacopœia, and found that its action is absolutely identical as regards effects in doses of the same size. The patient was a child (æt. 7 months) suffering from severe capillary bronchitis. In the usual sized doses (10 grs.) for a child of this age, your powder produced satisfactory emesis, and gave relief. In minute doses, subsequently administered, the customary expectorant action was found to be present, and by alternating the use of the ordinary root with yours from day to day in expectorant doses, and also, where occasion demanded, in nauseant doses, it was found impossible to distinguish between the two as regards their therapeutic effects."

Hitchin. Francis Ransom.

The Alleged Fundamental Errors in the B.P.

Sir,—Professor Tichborne has been so completely answered by Professors Redwood and Attfield, that it may appear superfluous that I should attempt to add anything to their remarks, yet I should like to say just a word on the subject. It has been a matter of some surprise to Dr. Redwood that so little notice was taken of the paper read at Manchester. No doubt the reason that the communication evoked so little discussion was its being regarded as very much a matter of splitting of hairs. It is obvious that no error can arise from the use of volumetric apparatus, if the different measures are correctly and consistently graduated, no matter what temperature has been taken as the standard. There would be no advantage, but rather the contrary, in using volumetric apparatus graduated at 62° F. and 4° C., and any action or recommendation of the Standards Department in that direction is quite uncalled for. It is certainly true that a "litre" means the volume of 1000 grams of water at 4° C., and in so far it is wrong to mark one of the ordinary measuring flasks "1 litre," when it contains "1000 grams at 15° C." This very small point seems to be all that Professor Tichborne's elaborate paper really amounts to. I think the Professor has fallen into error when he says that our standards fundamentally depend on the length of a pendulum vibrating seconds under certain conditions. The standards of measurement both of England and France are actual bars of metal carefully preserved, and in the event of their loss they must be restored by reference to the authorized copies. The length of a pendulum vibrating seconds at a given place would be affected by at least two circumstances: first, the alteration in the centre of gravity of the earth; and second, the alteration in the length of a second from the retardation of the earth's rota-

tion. It is therefore evident that such a system as a means of determining the standard of length would be open to serious error.

Edinburgh. D. B. Dott.

Syrupus Ferri Phosphatis.

Sir,—Mr. Martindale, in his letter on the above subject in your last issue, says that in his experience the liquor ferri phosphatis does not keep so well as the syrup itself.

This statement suggested to me that probably an account of my method of keeping the liquor might prove useful to some of your readers.

On the first appearance of the 'Extra Pharmacopœia' I converted Mr. Martindale's process for making the syrup. ferri phosphatis into one for the liquor by simply omitting the syrup, thus forming a solution requiring the addition of simple syrup in the proportion of three parts to one. The liquor is stored in full well-corked half-ounce bottles, and may be thus kept for an indefinite period. Although a deposit will occur when the bottles have been opened a little time, still the loss sustained by throwing away the spoiled portion is so small as to be practically of no account.

Proceeding in this manner I have always been able to use the whole of the stock of liquor, no matter over how long a period it may have been kept.

113, *Market Street, Manchester.* William Kirkby.

The Acidity of Syr. Ferri Phosph.

Sir,—It appears to be almost a law of Nature that whoso undertakes to correct the mistakes of others should fall into the pit of error himself. Having destroyed my rough notes, I can only surmise that neglect of the needful correction for sp. gr. led to the blunder in my letter of the 10th inst. Can it be possible that the compilers of the Pharmacopœia erred also, and had no intention of increasing by one half the acidity of the syrup?

But I do not wish merely to extenuate my own inaccuracy. Much more important is the question, Is the official formula the best attainable, and, if not, how can it be improved? Towards that end I would fain contribute my mite of experience.

Believing that the syrup darkened from the action of the acid on the sugar I formerly made a solution of 1 to 7 strength upon Mr. Martindale's plan, but using only 9⅝ oz. by weight of acid.

By the way, I might mention that I worked on the assumption that phosphoric acid, s. g. 1·500 contained 49 per cent. of phosphoric anhydride P_2O_5: but if the statement in the Pharmacopœia means that such contains 66·3 per cent. of H_3PO_4, and I suppose nothing else is intended, the strength in terms of P_2O_5 would be—

$$66{\cdot}3 \times 142 \div 196 = 48{\cdot}03 \text{ per cent.}$$

However, the solution made as above did not keep well; it darkened in colour and deposited a considerable crystalline precipitate. Since the formula was altered, I have made a solution 1 to 3, as described in Mr. Martindale's letter.

But if such solutions keep no better than the syrup itself, they involve a needless complication.

I, for one, should be glad to learn what has been the experience of others on this point.

Market Square, Dover. J. F. Brown.

Pil. Rhei Co.

Sir,—When one looks at the room there is for alteration in many of the pages of the Pharmacopœia it seems ridiculous to find fault with pil. rhei co., which without doubt forms the best preparation of all the twenty-one pill masses. The only drawback it has is that in the warmest weather of the year it becomes extra soft; beyond that there is no place for improvement.

Letters on this subject are becoming as plentiful as they did on "What is Laudanum?" and it seems to me that the same people who wrote those letters have taken fancy to pil. rhei co. Edward Brooke.

Sir,—Whatever "Another of the Craft" "has always understood," it is very evident that he does not understand the second page of the preface to the B.P., 1885, or he would not have ridiculed Mr. Downing's plan of making the mass, which is, as is claimed to be, "strictly B.P." If your correspondent will take the trouble to look at the page I have specified he will find something to this effect: "Wherever this method is employed (*i.e.*, placing the relative proportions side by side with the actual weights quoted) the term 'parts' signifies parts by weight, and the term 'fluid parts' signifies the volume of an equal number of parts of water." What he might have found fault with is that the B.P. unnecessarily orders the treacle "by weight," thus naturally leading a hasty reader to infer that the glycerine is not to be taken in a similar manner. I for one endorse Mr. Downing's opinion that if the B.P. instructions were followed more strictly we should have less complaining with regard to results, and that if some "pharmacists" would spend a quarter of the time in trying to understand the volume in question that they do in abusing it we might hope for a better state of things.

Nottingham. A Junior Assistant.

Sir,—In your last week's issue you published a letter from "Another of the Craft," who "always understood that one of the fundamental principles of the Pharmacopœia weights and measures system was, that liquids were to be measured by volume, and solids by weight (except where the contrary is stated)." Now where can "Another of the Craft" have got this idea from? I have carefully read through the prefaces of the two last editions of the Pharmacopœia, and nowhere does it there state that liquids are by measure and solids by weight; but if your correspondent of last week will refer to the preface of the B.P. 1885, p. x., he will find that "the term 'parts' signifies parts by weight, and the term 'fluid parts' signifies the volume of an equal number of parts of water." As, therefore, in the official formula for pil. rhei co. it does not state that fluid parts of glycerine are to be used, it is very plain (except to those who have always "understood" wrongly) that the authorities intend the glycerine to be weighed in making this preparation, and it is the more evident because in other formulæ containing glycerine the adjective "fluid" is placed before the term "parts," or whatever the unit of measurement may be.

The amount of excipient in pil rhei co. is, moreover, not too large, because although the Pharmacopœia orders "about" a certain quantity of treacle, yet, in the directions below the list of ingredients, it states that the glycerine is to be added, and afterwards "sufficient" treacle, therefore although the official formula throws out a hint as to the quantity of treacle necessary, it wisely leaves the matter to the discretion of pharmacists.

This matter, of course, is not of much importance in itself, but this letter may serve to point out to "Another of the Craft" that he has cast an unprofessional slur upon Mr. Downing's pharmacy, which he would not have done had he made himself better acquainted with the instructions of the Pharmacopœia, instead of relying so implicitly upon "what he had always understood." J. M.

An Explosive Mixture.

Sir,—On page 492 of a recent issue of the Journal, I find that the third prescription there given produced a mixture which it is stated exploded. Now I very frequently dispense the following:—

℞ Potas. chloratis	ʒij.
Acid. nit.-hyd. dil.	ʒij.
Tinct. ferri perchlor.	ʒj.
Glycerini	ʒvj.
Aq. Rosæ dilut. ad	℥vj.

Fiat mistura vel gargarisma.

I dissolve the potas. chlor. in hot water, and add the other ingredients. But, unlike your correspondent, I never had an explosion; perhaps he can account for the discordant result?

South Norwood. J. H. Baldock.

A Chemist's Apprentice's View of the Future of Pharmacy.

Sir,—The letter written by a "Disgusted Chemist's Apprentice" under this title in your issue of the 10th inst. does not, I hope, embody the sentiments of all chemists' apprentices.

In the first place, it is amusing to see how he first claims that the practice of pharmacy is "surely a profession," and afterwards bitterly laments that gentlemen at the head of the Society are seeking to make the chemist a "professional man."

As regards the Council of the Society failing to look after the interests of chemists, this is only to be expected when we bear in mind that the majority of chemists (including, I believe, those most loud in their condemnation of the Council's actions) take insufficient interest to fill up their voting papers for the election of members.

If I may presume to give a "Disgusted Chemist's Apprentice" a little advice, I would admonish him to cease looking on the Minor examination as a useless and expensive hardship, and remember that the future of pharmacy depends chiefly on the individual industry and energy of those who are now in the early part of their pharmaceutical career.

If we combine good business qualities with knowledge obtained by hard and diligent study, I venture to think we may fear neither drapers, grocers, nor anybody else, and may become what "Disgusted Apprentice" despairs of ever being, namely, "respected members of the profession of pharmacy."

EGUF.

Sir,—Your "Disgusted Chemist's Apprentice" must have chosen his occupation without proper inquiry as to the business he was entering upon, and it would be well for those who call it a profession to take note of the following memorandum, which I copy from the first volume of the Journal:—"At the first annual meeting of the Pharmaceutical Society, held at the Crown and Anchor in the Strand, on Tuesday, May 17, 1842, William Allen, F.R.S., President, in the chair, the Council in the report says, 'It should be considered that the Society is established for the general good of the trade.'" Mr. Luckombe moved the first resolution, and said he was glad to remark that the Council in several parts of the report continued to speak of the trade, a term which he hoped chemists and druggists would not discard.

AN 1842 M. P. S.

Sir,—I hope the letters from two apprentices which have lately appeared in the Journal may set some of us thinking, and may finally result in practical good.

On all sides at the present time there seems to be a looking for State assistance, though what is to be the character of this assistance does not appear. We hear from time to time vague but stirring addresses, calling upon us to bestir ourselves, to be true, to quit us like men and we shall triumph. This is all very nice and proper as far as it goes, but it is not enough. The question is what are we aiming at? Legislation has hitherto in no sense been for our protection or assistance, and the sooner this is recognized the better. The days of protection, except protection of the public from harm, are past and gone. It is useless trying to revive it on our behalf. What is the chemist of the future to be? This is what we must answer before we can hope for State help. At present he can best be described as a shadowy, boneless animal. Parliament will never grant protection to him I am sure.

All State protected professions enjoy their respective privileges from ascertained fact that it would be injurious to the people at large if unqualified persons did the work allotted to each profession, and how can we hope to be excepted from the rule? What we must have is an evolution out of our present motley mass; then when the process is complete, we can take our new creation to the Houses of Parliament and say: "Here is a man who can do certain things (to be hereafter enumerated) better than anybody else. The people have hitherto been wronged by not having his services; give them protection by allowing no one to perform those services but our man." Having shown the conclusiveness of this, the chemist of the future will be as firmly established by law as the lawyer, doctor, or divine. I confess I do not see very far upon the road, but done this must be, otherwise we may have lots of legislation but no help. Having obtained the Charter, make the examinations as difficult as you like; Coptic, Cherokee, ground and lofty tumbling—anything—the stiffer the better, stiff exams. never keep a good man out of anything. In the meantime it is cruel to sneer at a young gentleman who grumbles from his disappointed soul at the result of three years behind a country counter.

I am led to make these remarks in hope your correspondent "Hopeful" may assist by crystallizing his ideas for us, and so see if something cannot be done to untie the tangled knot into which pharmacy seems to have wriggled.

SPERO.

THE FUTURE OF PHARMACY.

Sir,—I sincerely trust in the interests of our trade that the correspondence recently commenced in the Journal may result in the arousing to action of our Council.

If we are so constantly defeated in courts of law whilst protecting ourselves it clearly shows that the Acts which should shield us are defective and require to be remedied. The Pharmacy Act of twenty years ago applied to these days is no more than a farce. I claim that a chemist of to-day has no protection whatever accorded to him, and I think it would be a move in the right direction if the Council elected to look to the interests of the trade did so, and would endeavour to obtain a revision of the present defective Act, which in reality defends us just about as much as though it did not exist. To talk in the laboratory about the honourable calling of pharmacy is one thing, to become acquainted with the competition which should be illegal is another. The grocers and drapers as advertisement for their businesses sell for cost price foods and patent medicines, many of which contain strong poisons, whilst drug companies composed of the requisite number of unqualified shareholders in order to register under the Limited Companies Act and over-ride the Pharmacy Act, dispense prescriptions, and sell drugs at about one-third the usual charge.

Out of the many poisoning cases very few inquests take place without dissatisfaction being expressed at the ease with which the public are able to obtain poisonous drugs. The dispensing and sale of all drugs and medicines, whether covered by an Inland Revenue stamp or not, should be legal only by persons properly qualified, and should be illegal by companies, unless the several members of which it is composed are each and all qualified. I believe that this already applies to pharmacy in Victoria.

I feel confident that the chemists throughout the kingdom will gladly support the Society if it will show that it really means business, and intends looking to the interests and rights of the trade.

We require entire revision of the Pharmacy Act, but nothing will be done by Government unless we apply, and the sooner work in earnest is commenced the better for us.

Let us first have protection for those already in the trade, and then follow with a higher standard of education.

We are told that a perfect vacuum cannot be produced, but I think that unless we try and improve our present position the "Future of Pharmacy" will be a good representation of one.

A PHARMACIST.

Erratum.—The passage from Mr. Gravill's paper as quoted last week on p. 516 was incorrect; it should have read "1 gram of borax (Howard's) in 25 c.c. of water."

J. P. J.—We are unable to give you any definite information as to the method of preparing the solution, which constitutes one of the claims for novelty under the patent.

E. Atkins.—We are much obliged to you for the copy of the periodical, but the subject referred to is not within the scope of this Journal.

J. F. Claridge.—We are unable to suggest any way in which a "legal remedy" for the evil referred to can be applied; and we think that probably some risk would be incurred "in publicly setting forth the condition of things." The objectionable practice referred to obtains in other parts of the country as well, and is one that is very difficult to deal with.

Lex.—As a matter of prudence, the authority of the prescriber should be obtained before supplying the medicine in larger quantities than specified in the prescription.

G. Welborn.—Although we quite agree with the opinions expressed, we think that any good that might result from the publication of your letter would be more than counterbalanced by the ill-feeling it would provoke.

W. D.—(1) The taper cylinder is perhaps the best form of percolator for most purposes, but when the material operated upon has a tendency to swell, a more globular form may be desirable. (2) Authorities simply state that the substance is "soluble in alcohol;" to ascertain the extent to which it is so is simply a matter of experiment.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Kirkby, Bennett, Sapwell, Freda, Elborne, Jones, Millard, Abraham, Philp, Sharples, C. and D., J. M. T.

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Fig. 6.

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Fig. 8a.

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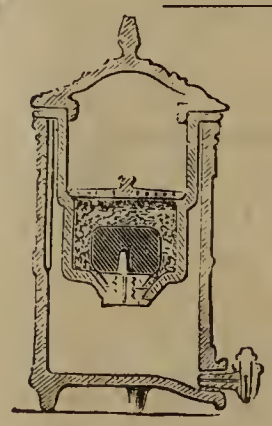

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 914.] SATURDAY, DECEMBER 31, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

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RICHARD BREMRIDGE, Secretary and Registrar.

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The Catalogue of the Society's Libraries in London and Edinburgh has just been revised and reprinted. Each Member, Associate and Apprentice of the Society will, on application to the Secretary, be supplied *gratis* with one copy.

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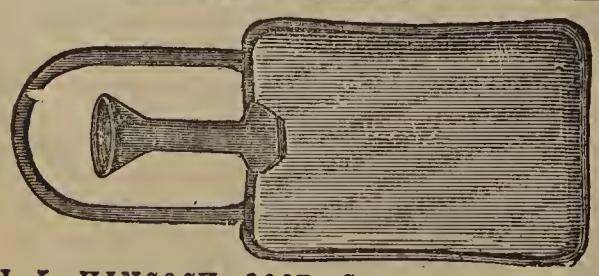

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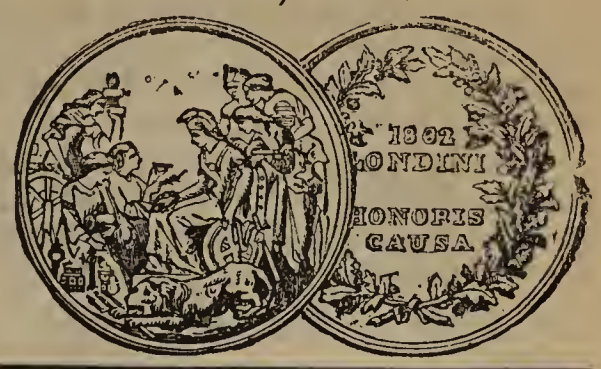

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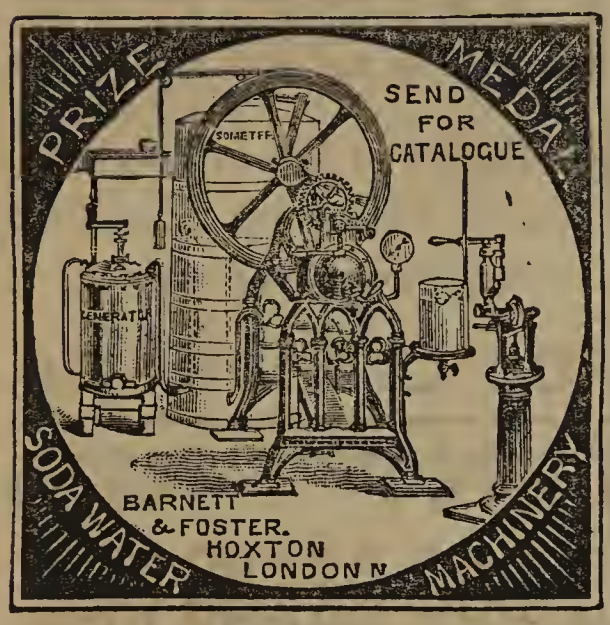

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"THE MONTH."

Essential Oil of Bitter Almonds.

In text-books the essential oil of almonds is usually represented as consisting of benzaldehyd containing a variable quantity of hydrocyanic acid, but although it is sometimes vaguely intimated that the hydrocyanic acid occurs in combination, no definite information is given as to the nature of the compound. As is generally known, the essential oil is obtained by distilling in a current of steam the cake from which the fixed oil has been expressed, after it has been macerated with water. According to Liebig and Wohler the amygdalin in the almonds is broken up under the influence of emulsin in the presence of water into glucose, hydrocyanic acid and benzaldehyd, the last-named being commonly spoken of as oil of bitter almonds. But Dr. O. Linde has come to the conclusion (*Pharm. Centralh.*, Nov. 15, p. 567) that the action of the emulsin is more limited, and that the decomposition of amygdalin is into glucose and benzaldehydcyanhydrin ($C_6H_5CH(OH)CN$). During the distillation of the oil this compound is partially decomposed by heat into benzaldehyd and free hydrocyanic acid, a little of the latter combining to form ammonium cyanide. Benzaldehyd and benzaldehydcyanhydrin are both only very slightly soluble in water, and, therefore, separate for the most part from the aqueous distillate, whilst hydrocyanic acid and ammonium cyanide remain dissolved. The essential oil of bitter almonds would therefore, according to this view, consist of a mixture of benzaldehyd and benzaldehydcyanhydrin, but in variable relative proportions dependent upon the temperature at which the distillation was conducted and the time occupied. About two years since Mr. Braithwaite reported (*Pharm. Journ.*, [3], xvi., 659) that in the examination of four samples of oil he had obtained indications corresponding with the presence of 6·38, 5·3, 5·5, and 4·15 per cent. of hydrocyanic acid. As benzaldehydcyanhydrin contains 20·3 per cent. of HCN, Dr. Linde calculates that these oils would have contained respectively 31·5, 26·0, 27·0 and 20·5 per cent. of that compound and that the remainder would have been benzaldehyd. He therefore suggests that it would be simpler and cheaper to replace essential oil of bitter almonds, especially when intended for medicinal use, by a mixture of benzaldehyd and benzaldehydcyanhydrin containing a definite quantity of hydrocyanic acid. Further he points out that the specific gravity of the oil rises with the proportion of hydrocyanic acid present, but that on the other hand the odour becomes less pleasant, since the peculiar odour of benzaldehydcyanhydrin, though faint, is not agreeable.

Guaiacol.

The statement that creasote can be administered with advantage in the treatment of phthisis has led to the suggestion that instead of the varying mixture of phenols of which that substance is known to consist the use should be restricted to its principal constituent, guaiacol, which is said to represent from 60 to 90 per cent. of genuine beech-tar creasote. According to Professor Sahli the results obtained by him in the treatment of phthisis with guaiacol corresponded with those previously obtained with creasote (*Pharm. Zeit.*, Dec. 3, p. 692); but if this be all it is not clear in what the advantage would lie, except that it would exclude the constituents of the so-called "coal-tar creasote," which might be sometimes present in samples of beech-tar creasote as a sophistication. The manufacturing method of preparing guaiacol is described as consisting in treating the portion of beechwood tar that distils between 200° and 205° C. with moderately strong alcohol and fractionating; the portion of the distillate that passes over at 200° is then dissolved in an equal volume of ether and excess of concentrated alcoholic potash solution added. The separated crystals of the guaiacol-potassium compound are then washed with ether, recrystallized from alcohol and decomposed with dilute sulphuric acid, and the guaiacol fractionated. When pure the guaiacol is said to form a clear liquid that refracts light strongly, has an agreeable aromatic smell, boils at 200° C., and has a specific gravity of 1·1171 at 13° C. It dissolves in caustic alkalies, forming instable compounds resembling salts and gives with ferric chloride an emerald-green colour. If the foregoing be a correct description of true guaiacol it would appear that the same compound can be yielded only in relatively very small proportion in the destructive distillation of guaiacum resin, for in the experiments of Mr. John Williams, recorded in a "Note on Guaiacol," read before the British Pharmaceutical Conference in 1872 (*Pharm. Journ.*, [3], iii., 231), it was found that after several rectifications of the crude distillate from the resin, only a small portion distilled at 200° C., while four-fifths passed over at 210°, and the remainder at 215°. As guaiacol readily darkens it should be sheltered from light.

Oxynaphthoic Acid.

In referring to a compound that has been recently introduced commercially as a disinfectant and antiseptic under the name α-oxynaphthoic acid, a writer in the *Pharmaceutische Centralhalle* (Dec. 8, p. 610) points out, that so far as the acid is concerned, apart from its application and mode of preparation, it is by no means a novelty. It was, in fact, prepared nearly twenty years ago by Herr Eller (*Berichte*, i., 248), by the reaction of sodium upon naphthol in an atmosphere of dry carbonic anhydride in a manner analogous to that by which—using phenol instead of naphthol—Messrs. Kolbe and Lautermann had just previously effected the synthesis of salicylic acid. Herr Eller named the compound carbonaphtholic acid, and represented it by the formula—

$$C_{10}H_6 \begin{cases} OH \\ CO{\cdot}OH. \end{cases}$$

Subsequently, as Eller was known to have worked with a mixture of α- and β-naphthol, Herr Schäffer repeated his experiments, using the pure separated naphthols. In this way he obtained an α-carbonaphthoic acid, which corresponded closely in its characters with the product obtained by Eller from the mixed naphthols, a circumstance that found an explanation in the difficulty with which β-naphthol undergoes conversion under the conditions mentioned. By varying the process, however, β-carbonaphthoic acid was also obtained, and found to differ from the α-acid in having a higher melting point—235° C. against 185° C.—and in giving with ferric chloride a violet-black colour instead of a blue. These acids have since formed the subject of other communications, in which they have also been variously designated α- and β-oxynaphthoic acids and naphtholcarbonic acids. In a communication made to the German Chemical Society last October (*Berichte*, xx., 2699), Messrs. Schmitt and Burkard stated that they had succeeded in preparing α-naphtholcarbonic

acid through the action of liquid carbonic acid upon absolutely dry α-naphthol-sodium in an autoclave heated to a temperature of about 130° C. This process has been patented, and is now followed in the production of the acid on the manufacturing scale. The acid, which is sent out under the name "α-oxynaphthoic acid," is described as occurring in colourless acicular crystals, almost insoluble in cold water (1 in 30,000). It is said to be a powerful antiseptic, retarding the putrescent decomposition of blood and urine much more effectively than salicylic acid, with which, of course, it agrees closely in chemical constitution.

Sozoiodol.

"Sozoiodol," the name given to a new iodine compound which has been recommended by Dr. Lassar for use in the treatment of certain skin diseases, is a fresh instance of the bewildering confusion that is continually augmenting through the arbitrary and unsystematic manner in which the multitudinous new chemical competitors for medical favour are named. A first impression might naturally be that sozoiodol has some relationship with iodol; but this would be wrong, since iodol is an iodized pyrrol, whilst it is stated that sozoiodol is a benzene derivative. Looking in another direction, it has been described by more than one writer as a compound resembling ortho-oxyphenylsulphurous acid—which bears also the shorter name of sozolic acid—but with a third hydrogen of the benzene nucleus replaced by iodine. This however has proved to be also incorrect, as the compound is now authoritatively stated to be an acid sodium salt of "iodparaphenolsulphonic acid" (*Pharm. Zeit.*, Dec. 24, p. 734). It is represented by the following curious formula:—

$$2C_6H_3(I)(OH)(SO_3Na) + C_6H_3(I)(OH)(SO_3H)$$

Sozoiodol occurs as a white shining crystalline powder, which does not melt upon being heated to 200° C., but when heated sufficiently in a test tube it is decomposed, and gives off violet iodine vapour. It is quite odourless, has a faintly acid taste, is soluble to the extent of 7 per cent. in cold water, and more soluble in hot water; it is also difficultly soluble in cold alcohol, but more freely in hot.

Iodine Trichloride.

Still another iodine compound has been brought forward as a disinfectant and antiseptic, but this time it is the application rather than the substance that presents the character of novelty, the trichloride of iodine (ICl_3) being one of the best known of the reputed compounds of the two halogens. It can be prepared by direct combination of the elements, in passing an excess of dry chlorine gas over moderately warm iodine; if the chlorine be not in excess the monochloride is formed. It is also formed upon mixing iodic acid with strong hydrochloric acid, or by the action of phosphoric chloride (PCl_5) on iodic anhydride (I_2O_5). But the most convenient method of preparing it is said to be (*Pharm. Zeit.*, Dec. 3, p. 692) to pass a full current of chlorine through wide tubes into a three-necked flask, into which, also, iodine is sublimed from a small retort fitted to the centre neck. The iodine trichloride is formed in delicate orange-yellow crystals, which if contaminated with the liquid monochloride are somewhat darker coloured. The compound, which consists of 54·39 per cent. by weight of iodine and 45·61 per cent. of chlorine, has a penetrating pungent smell, somewhat like that of bromine, and melts at 25° C. with loss of chlorine. In water it is tolerably freely soluble, the solution being pale yellow, strongly acid, and less strongly smelling than the dry preparation. It is also soluble in ether and in alcohol, but the alcoholic solution appears to undergo alteration even in the cold. This is more apparent upon warming a small quantity of the alcoholic solution and leaving it to evaporate spontaneously, chloral being left as a residue, recognizable by its characteristic odour. The behaviour of the compound towards strong bases shows that the chlorine enters first into reaction. Aqueous solutions keep better the more concentrated they are; weak solutions undergo gradual decomposition, with the formation of hydrochloric and iodic acids and monochloride of iodine, the change being promoted by the action of direct light. According to Professor von Langenbuch the germicide action of iodine trichloride exceeds that of carbolic acid by far, and approaches that of mercuric chloride, over which the compound has the advantage of being relatively non-poisonous. He recommends the use of an aqueous solution of the strength of 1 in 1000 to 1 in 1500, as a substitute for a 4 per cent. carbolic acid solution or a 1 in 1000 to 2000 sublimate solution, for the disinfection of the hands, instruments or wounds. The slight yellow discoloration caused to the skin can be easily removed by means of ammonia or sodium thiosulphate solution. Further, he recommends a solution of 1 in 1200 as an injection for gonorrhœa, or as an internal remedy for dyspepsia dependent upon the presence of bacteria, the dose in the latter case being a teaspoonful every two hours.

Oxygen Carriers.

Professor Lothar Meyer has published (*Berichte*, xx., 3059) the results obtained during a systematic investigation as to the extent to which different metallic salts are capable of acting as intermediaries in promoting oxidation. The experiments were made by passing through standardized solutions of the different salts, heated in a water-bath, currents of sulphurous dioxide and oxygen simultaneously, and determining the amount of sulphuric acid formed after a definite time. Salts of manganese were found to be the most energetic oxygen carriers. Manganous sulphate proved capable of promoting the combination of the sulphurous dioxide and oxygen to the extent of five molecules of sulphuric acid for every molecule of the salt in the solution. Manganous chloride approximated to this pretty closely, promoting the formation of 4·3 molecules of free sulphuric acid for each molecule of chloride. Next in order came cupric chloride and sulphate, and cuprous chloride, oxide and hydrate and the metal itself. Other salts that were found to induce oxidation to a greater or less extent were those of iron, cobalt, nickel, zinc, cadmium and magnesium; but salts of potassium and thallium in dilute solution were entirely without influence. The action is considered by Professor Meyer to be one of alternate oxidation and reduction, and as zinc, cadmium and magnesium are capable of exercising it to some extent it would seem that these metals may form subsalts that are as yet unknown.

Iodine and Iron.

Closely allied to the foregoing are some observations recorded by M. Fleury (*Journ. Pharm. Chim.*, Dec. 15, p. 529) which seem to show that the reaction between iodine and iron is not characterized by the simplicity with which it is usually credited, but that under certain conditions iodine acts as an oxidizing agent. As is

known, when these two bodies are brought into chemical contact by the intervention of water, there is at first an energetic reaction with development of heat. If however the containing vessel be cooled so that the temperature does not exceed 15° C., the reaction quickly ceases, although the iodine may be entirely dissolved and the liquid strongly coloured by it; if the liquid be then filtered only a residue of iron, free from peroxide, is left on the filter. But if the liquid be heated to boiling its early red colour quickly disappears, and upon filtration it yields a notable quantity of ferric oxide, as much as 2 per cent. having been found in one experiment. In order to dissolve all the iron it is necessary that the iodine should be considerably in excess, and M. Fleury says that, reciprocally, the whole of the iodine does not pass into the state of protoiodide except under the influence of iron in excess. The explanation given is that sesquiiodide of iron at first formed is dissociated under the influence of heat, yielding ferric oxide and hydriodic acid; the latter reacting on free iron forms protoiodide, giving rise at the same time to the evolution of hydrogen.

Action of Sea-Water on Iron.

The chemical change which cast-iron undergoes during long-continued immersion in sea-water is usually stated to consist in the removal of the greater part of the iron, leaving a residue consisting of graphite and a carbide of iron (FeC_3). This has been practically confirmed recently by the result of the examination by Mr. C. N. Draper of a fragment of grey cast-iron rail supposed to have lain for fifty years at half-tide level, so that it would have been about twenty-five years immersed in sea water and twenty-five years exposed to the action of the atmosphere (*Chem. News*, Dec. 16, p. 251). The fragment, which was 20 millimetres in depth, was found to have been converted on its upper surface for a depth of 7 millimetres into a brown grey graphitoidal substance. This altered cast-iron was easily removed with a knife, leaving the iron bright underneath, but a considerable amount of heat was developed during the removal. It was attracted by the magnet, gave evidence with iodine of containing abundance of unoxidized iron (presumably as FeC_3) and when examined electrolytically showed carbon equal to 23·6 per cent.

Chloral Hydrate, Iodoform and Mercurial Salts.

In some experiments made about two years since (*Bull. Soc. Chim. Paris*, xliii., 420), M. Cotton observed that in the reaction between mercuric oxide and chloral hydrate or iodoform, in the presence of moisture, and at the temperature of 95° or 100° C., the latter compounds are oxidized with disengagement of carbonic dioxide and carbonic oxide. Continuing his experiments with other salts of mercury he now reports (*Journ. Pharm. Chim.*, Dec., p. 481) that chloral hydrate reduces mercuric acetate, with disengagement of carbonic dioxide, but no monoxide, and formation of mercurous acetate, and that it reduces mercuric nitrate, with the disengagement of carbonic dioxide and the formation of calomel. Iodoform similarly reduces mercuric acetate, giving rise to the formation of mercurous acetate; but it does not reduce mercuric nitrate, the reaction being limited to the formation of the corresponding iodide. Chloroform and bromoform are without action upon either of these salts.

New Thermometer Scale.

A new thermometer scale has been devised by Mr. J. Asher, of Ontario, which, however unlikely to come into use, presents some apparently advantageous features (*Scient. Amer.*, Nov. 26, p. 337). This scale is based upon the division of the space between absolute zero (—459·4 F.) and the freezing point of water into one thousand degrees, which are termed "milligrades." One of the advantages claimed for this scale is its adaptability for reducing the measurement of gases to the standard temperature, as the expansion of a gas for each of the new "milligrade" degrees would be 0·001 of its volume measured at the freezing point of water. Other points are the abolition of the minus mark, an absolute, not a conventional degree, and the relative smallness of the degree, which corresponds very closely to half a degree of the Fahrenheit scale, the ratio being as 30 to 61. Some of the principal intervals according to the milligrade scale would be:—absolute zero, 0°; mercury freezes, 853°; water freezes, 1000°; blood heat, 1134°; alcohol boils, 1293°; water boils, 1366°.

Spurious Mace.

Professor Hanausek reports the occurrence in Germany of a spurious variety of mace (*Pharm. Post*, Dec. 4, p. 785). It is described as being purple-brown in colour, rather more than two inches long and rather narrow in proportion to its length, it being apparently the mantle taken from a seed of oblong form. At first it was thought to consist of the arillus of *Myristica fatua*, Houtt., but this was inconsistent with the total absence of odour or taste from the drug. Similarly, *M. officinalis*, Mart., and *M. sylvestris*, Houtt., had to be excluded, and the spurious mace was considered to present the greatest resemblance to the Bombay mace described by Tschirch (*Pharm. Zeit.*, 1881, No. 74), which is derived from *Myristica malabarica*, Lamk. Dymock ('Mat. Med. West. Ind.,' 2nd ed., p. 664) says that the arillus from the seed of this plant is of a dark brown-red colour, and has adherent to it on the inside a thin papery membrane of a light brown colour. He quotes Tschirch as saying that the epidermal cells of the arillus are radially elongated and twice as high as those of true mace, which are tangentially elongated. Their walls show the cellulose reaction with iodine and sulphuric acid, and with chloride of zinc and iodine swell and turn faintly blue. The oil cells are very numerous, located near the epidermis on both sides, often close together in groups of two or three, oval in shape, somewhat radially elongated, and contain a dark yellow usually resinified oil and frequently also a brownish resin.

Strophanthin.

In a communication read recently before the Société de Thérapeutique (*Nouv. Rém.*, Dec. 24, p. 545), Messrs. Adrian and Bardet made known some conclusions in respect to the chemical nature of the active principle of strophanthus seeds which differ from what has hitherto been published. They state that having prepared some pure strophanthin they found that it did not reduce cupro-potassic solution, nor directly even after being treated with an acid. But after an aqueous solution acidulated with hydrochloric or sulphuric acid had been kept for several hours at a temperature of 40° to 50° C. the solution became turbid and a deposit formed upon the side of the flask. The liquid then not only reduced Fehling's solution, but it gave distinct reactions with the ordinary alkaloid reagents. The deposit on the flask was ascertained to be a resin soluble in alcohol and precipitated by water.

They therefore conclude that strophanthin is a glucoside that breaks up into glucose and an alkaloid that is probably the strophanthidine of other authors. Messrs. Adrian and Bardet also observed indications of the presence of an alkaloid in the liquid obtained by macerating crushed strophanthus seeds in water; they do not think however this would prove to be the same alkaloid as that resulting from the decomposition of strophanthin, but one probably related to or identical with the ineine of M. Hardy.

Ephedrine.

Professor Nagai, of Tokio, reports that he has separated from the *Ephedra vulgaris*, var. *helvetica*, a gnetaceous plant, an alkaloid that he has named "ephedrine," and which he has found to possess the property of dilating the pupil in a 10 per cent. solution. He considers that it may be used where atropine is contraindicated, whilst having the advantage over homatropine that it can be more easily and cheaply prepared (*Berl. klin. Wochenschr.*, p. 706). Professor Nagai does not however give any information as to the composition of the alkaloid, or the method by which he prepared it, though he says that the acicular crystalline hydrochlorate is freely soluble in water and that the solution is unaffected by light.

Pilocarpine in Yellow Fever.

In the *Medical Bulletin* (Nov. 1887, p. 337) Dr. E. Hebersmith gives, in detail, several cases of yellow fever which were cured by the subcutaneous injection of hydrochlorate of pilocarpine, in the dose of $\frac{1}{4}$ grain. He is so satisfied of its value in this disease, that he remarks that if pilocarpine acts in the hands of others as it has in his hands, "yellow fever has become a very trifling matter indeed."

Sida floribunda.

Dr. Martinet has discovered that the leaves of *Sida floribunda*, a malvaceous plant common around Lima, act as a mechanical vermifuge. The properties of the leaves appear to be due to extremely minute and somewhat resistant spines (stellate hairs?), which do not appear to be broken during mastication, and which, on reaching the smaller intestine, irritate the worms, and cause their dislodgement (*Drug. Circ.*, Dec., p. 273, from *Nouv. Rem.*).

Trebizond Honey.

Mr. H. J. Ross contributes additional information concerning Trebizond honey in the *Gardeners' Chronicle* (Dec. 17, p. 748). He states that there is at Trebizond but one rhododendron (*R. ponticum*), which forms a high undergrowth in woods, and also grows independently on the sides of hills, forming dense copses, and that the *Azalea pontica* grows in the same sites, the two plants growing both mixed together and in separate patches. He has never met with the *Nerium Oleander* near the Black Sea, although he has seen it fringing the streams for miles on the plains between the Taurus and the Mediterranean, where the climate is much warmer than that of the Black Sea. Furthermore he remarks that the people in the country around Trebizond attribute the poisonous qualities to the *Azalea pontica*; and as a matter of fact, in the neighbouring districts where the azalea does not grow, as at Samsoon, the honey is innocuous. The non-poisonous honey from Trebizond is derived, he believes, from the upper districts farther from the seacoast and beyond the region of the azalea and rhododendron, as they only ascend to a certain height on the great mountain chain forming th first of thegreat steps on which is reared the high Armenian plain.

Absorption of Water by Mosses.

Mr. J. Reynolds Vaizey, in an interesting paper on the absorption of water by mosses (*Ann. Bot.*, p. 148) has shown by a series of experiments made on *Polytrichum commune* and *P. formosum* that water can pass readily through the external cell walls of the leaf, although it will not do so through the surface of the fruitstalk. This he shows to be due to the fact that in the leaf there is no layer of cuticle present, and that the external walls of the cell have undergone some change, so that water is easily absorbed by them. The seta or fruit stalk, however, presents this structure at the base only; the surface of the seta, apophysis and sporangium is smooth and glistening, and not capable of absorbing water, in consequence of being strongly cuticularized, although water readily passes up the interior of the seta (*Ann. Bot.*, p. 148).

Sieve Tubes.

In a paper on the obliteration of sieve tubes in the *Laminariæ* (*Ann. Bot.*, p. 95) Mr. F. W. Oliver expresses his opinion that the callus or thickening of the sieve plates in plants is formed, as suggested by Wilhelm and Janczewski, by an alteration of the cell wall, and not from the contents of the cell. Although in the foreign genera *Macrocystis* and *Nereocystis* true sieve tubes very like those of *Cucurbita* are met with, yet in the majority of the *Laminariæ* sieve tubes are represented only by narrow tubes known as trumpet-shaped hyphæ, in which the callus extends up the sides of the cell wall and is not restricted to a thin plate-like form. Mr. Oliver has been fortunate enough to meet with an instance in which the mode of formation of the callus is shown in different stages of development, the walls of the tubes presenting callous degeneration at intervals. The callus of *Laminaria* was found to agree with that of flowering plants in its micro-chemical reactions, and may be regarded as chemically the same substance.

Function of Raphides.

Dr. E. Stahl suggests that raphides, or needle-like crystals of calcium oxalate, are not, as is generally taught, mere products of excretion in plants; but that they serve a useful function to the plant in protecting it from the attacks of herbivorous animals. Snails, he finds by experience, will reject those parts of the plant which contain these crystals, and consume only those which do not. The poisonous properties attributed to the leaves of *Arum maculatum*, and their burning taste, are due solely to the enormous quantities of crystals of calcium oxalate stored up in them.

Preserving Plants for the Herbarium.

An excellent method of preserving the colours of flowers is given in the *Annals of Botany* (Nov., p. 178) by S. Schönland. Although it has been followed in Berlin for some years it does not appear to have become known to any extent in this country. It consists practically in a process of deoxidation by means of sulphurous acid. A saturated solution of sulphurous acid with water is mixed with methylated spirit in the proportion of three parts of the former to one of the latter. Plants with thick leaves are left for twelve or eighteen hours in this liquid, but delicate flowers only from five minutes to half an hour. After removal they are allowed to dry by exposure to the sun or to artificial heat and are then at once placed between sheets of drying paper in the usual way. If enough sheets are used it is rarely necessary to change the

paper. The above treatment not only preserves the colour, but hastens the drying, so that sempervivums can be dried in two days and orchids and arums in one day. Plants which usually turn black in drying, such as *Melampyrum* and *Lathræa*, retain their natural colour. In a few cases in which the colour of the petals disappears, it returns when the plant is dry. The only difficulty attending the process is that of laying out delicate blossoms after treatment with the solution.

Coconut or Cocoanut.

Professor Balfour directs the attention of botanists (*Ann. Bot.*, p. 185) to the fact that cocoanut should correctly be written coco, and that now that coca is becoming an important therapeutic agent it is all the more necessary that a correct orthography should be followed, so that less confusion may arise than at present appears to exist, he having known people who were content in the belief that the coconut palm was the source of both cocoa and coca. Dr. Balfour appears, however, to have overlooked the fact that the name coco is commonly applied to the root of *Colocasia antiquorum*.

THE CHEMISTRY OF NITROGEN AS DISCLOSED IN THE CONSTITUTION OF THE ALKALOIDS.*

BY PROFESSOR DR. ALBERT B. PRESCOTT.

(*Concluded from page* 521.)

The first representatives, methylamine and ethylamine, were obtained by Adolph C. Wurtz, in February, 1849,† through the action of potash upon cyanic ethers, the methyl and ethyl isocyanates. The year before he had made report‡ on the same reaction, with the surmise that he had obtained a derivative either of a urea, or of an ether,§ but after obtaining methylamine as a caustic volatile alkali, he was emphatic in declaring it an ammonia. "I have succeeded, in fact," he said, "in converting ammonia into a true organic compound, by adding to it the elements of the hydrocarbon CH_2."‖

Wurtz at first christened the new products "methylamid" and "ethylamid." Dr. T. Sterry Hunt, then writing in *Silliman's Journal*,¶ proposed the names of "methylamine," "ethylamine," etc., as "more consonant with the nomenclature of the alkaloids." The names "methyliak," the "ethyliak," "butyriak," etc., were offered by Dumas; and the names "methammine," "ethammine," etc., by Gerhardt. In his communication of August, 1849, Wurtz adopts the terms "methylamine," etc., and about this time he presents rational formulæ, on the ammonia type, for a good number of artificial bases, aniline, toluidine and picoline, for nicotine and conine, and claims formulæ for several oxygenated bases.

Dr. A. W. Hofmann had been engaged in investigation "on the volatile organic bases," communicated in 1849 and 1850, and already referred to, and he welcomed "the splendid investigation of M. Wurtz" with unstinted enthusiasm. He adopted the theory of substitution for the hydrogen of ammonia, and with remarkable celerity he verified the theory by replacing the second and the third atoms of hydrogen by organic radicals. Beyond this he substituted the fourth hydrogen atom of ammonium salts, explained the formation of "white precipitate" and other metallic derivatives, and set forth the likeness of oxygenated alkaloids to the compounds of ammonium. For the greater number of his results, he employed the simple reaction which bears his name, the reaction between iodides or bromides of radicals and the ammonia, or lower derivatives of ammonia. His masterly reports of 1850 and 1851 fill seventy-eight pages of the *Philosophical Transactions*,* concluding with an extensive classification of new substances, and with ambitious expectations of finding the constitution of important vegetable bases. This reaction, used by Hofmann for the introduction of "alkyls" or alcohol radicals into ammonia, producing successively primary, secondary, and tertiary amines and then alkyl ammonium salts, is a reaction now in constant use upon alkaloids, in the course of investigations. By this reaction, for example, morphine is convertible into methyl-morphine, which is codeine, and a homologous ethylmorphine is readily obtained. Brucine is dimethoxy-strychnine; a methyl-strychnine, and an ethyl-strychnine, are produced, and these artificial products are under trial as to their physiological effects. Quinine is a methoxy-cinchonine. Cocaine is readily formed by the introduction of methyl into benzoyl-ecgonine, and the corresponding ethyl, propyl, and butyl products are now under physiological trial. It is of great practical interest that homologous alkaloids, prepared by successive substitutions of methyl through Hofmann's reaction, are found to exhibit a gradation of physiological intensity quite in correspondence with the graded intensity of the homologous alcohols of the paraffin series.

Whatever we have gained by modern theories of other types of structure, it still remains true that the nitrogenous bases represent the type ammonia. Whatever other types govern the constitution of alkaloids in general, they carry central atoms of nitrogen, whose valence and whose chemical activities are typified by the nitrogen of this simple volatile alkali. Nevertheless, the type ammonia represents only the "ammonia-rest," a small part of the molecule of a natural fixed alkaloid. Unable to reach a clue to the constitution of the larger part, and therefore without data as to the relations and valences held by nitrogen, chemists were not able to assign rational formulæ to the oxygenated alkaloids of plants in general until within the past ten or fifteen years, during which time light has been obtained upon typical structures of the carbon and hydrogen of these bases.

II. Nitrogenous Bases represented by Aniline.

Phenylamine or amidobenzene is the type, in its simplest form, of compounds made by the substitution of an aromatic radical in ammonia. Obtained by distillation from indigo in 1826, from coal-tar in 1834, and from benzene by reduction of the nitro derivative in 1841, it was at once recognized by Wurtz and by Hofmann in 1850 as a primary amine. Its aromatic constitution, with that of benzene itself, came to light in the closed chain theory

* Address before the Section of Chemistry of the American Association for the Advancement of Science.

† *Compt. Rend.*, xxviii., 224; *Chem. Gaz.*, vii., 115, 141. August: *Compt. Rend.*, xxix., 169; *Chem. Gaz.*, vii., 356. 'Mémoire sur une série d'alcaloïdes homologues avec l'ammonique,' 1850: *Ann. Chem. Phys.*, [3], xxx., 443; *Chem. Gaz.*, ix., 221, 247, 273; *Jour. Chem. Soc.*, iii., 90; *Am. Jour. Sci.*, ix., 281; xii., 115; *Jahr. d. Chem.*, 1849, 392.

‡ Wurtz, 'On the cyanic ethers,' 1848: *Compt. Rend.*, xxvii., 241; *Chem. Gaz.*, vi., 404; *Jahr. d. Chem.*, 1847–8, 679.

§ "Either a urea in which one equivalent of water is replaced by one of ether, or methyl ether in which the molecule of oxygen (weight 6) is replaced by a molecule of amidogen, NH_2." The latter view corresponds to that in the prediction of Liebig already quoted.

‖ "Ammonia," said Wurtz, "should decidedly be regarded as the most simple and most powerful of the organic bases; and it would be for all chemists the type of that numerous class of bodies, did it not differ in one undoubtedly important character, but to which," he concludes, "an exaggerated value has been attributed. Ammonia contains no carbon."

¶ T. Sterry Hunt, "The constitution of Leucine, and the late researches of M. Wurtz," *Am. Jour. Sci.*, ix., 66.

* *Phil. Trans.*, 1850, i., 93-131. 1851: i., 357-398. *Jahr. d. Chem.*, 1851, 482-496; *Ann. Chem. Phar.*, lxxxiii., 91.

of Kekulé in 1865.* The aniline colour industry instituted by the inventions of Perkins in 1856, could not have reached its great and beneficent development without the impulses due to the knowledge, first, of the ammonia type in the linking of nitrogen, and second, of the closed chain of six positions of carbon. On the other hand, the resources of pure organic chemistry could not have reached the wide extent they have attained without the patient and efficient investigation of the industrial chemists engaged in the work of the world.

While the aromatic type of structure has furnished artificial nitrogenous bases for innumerable dye stuffs the inquiry whether any considerable number of the alkaloids of plants were aromatic compounds or not, was for years a perplexing question. Large numbers of vegetable alkaloids yield simple aromatic products when decomposed. For example, atropine and its related alkaloids, when heated or forcibly oxidized, yield benzoic and salicylic aldehydes, and related bodies. At the same time, research has failed to find rational formulæ for alkaloids wherein nitrogen was attached, as it is in aniline, to a benzenoid group—a closed chain of six carbon positions. It was not until the discovery of the pyridine and quinoline type in the alkaloids—a type of aromatic structure holding five positions of carbon and one of nitrogen within the closed chain—nitrogen in a position central to the molecule—that it could be understood in what way the natural alkaloids, yielding aromatic decomposition products, were themselves of aromatic composition.

Before taking up the consideration of the pyridine type of bases, it may be said that the complete benzenoid group, so extensively found in vegetable acids, has been very little found in vegetable bases. In narcotine and narceine the benzenoid group is found, with four hydrogen atoms replaced, but not at all replaced by nitrogen. The nitrogen of the compound is not directly linked to the complete benzenoid group.

III. The Pyridine Type in the Vegetable Alkaloids.

The aromatic constitution of pyridine and quinoline was apprehended in 1870.† In this constitution, pyridine differs from benzene only in the substitution of one trivalent N for the trivalent group CH ; and quinoline differs from naphthalene only in the substitution, in the same way, of one N for one CH. As constituted in closed chains of six positions, pyridine and quinoline are aromatic compounds, but of a type radically different from that of complete benzenoid bodies conjugated with nitrogen, like aniline or azo-benzene. The pyridine molecule, C_5H_5N, violates the first condition of benzenoid compounds, namely, that the six primary positions of the molecule, C_6H_6, are all equal to each other. Here we have *nitrogen interlinked in the closed chain*, in the position of central influence.

The great numbers of compounds which have been found in nature and formed by art upon the *pyridine type* during the last sixteen years, give evidence that this type is an essential effect of *the chemism of nitrogen* as much as the benzene type is an effect of the chemism of carbon. The fact that only one atom of nitrogen is found to enter the closed chain of six positions renders it not unlikely that the nitrogen atom is directly united to more than two atoms of carbon in the ring. That the nitrogen is united to three atoms, Riedel and others‡ some time since concluded on experimental grounds.

That the vegetable alkaloids containing oxygen are *tertiary* amines, or ammonium compounds, so that they do not contain hydrogen directly united to their nitrogen—and so that all the hydrogen of the typical ammonia is replaced—was announced by A. W. Hofmann in 1851, and has always been assented to. With this view, the theory of the pyridine type quite accords. Pyridine and quinoline are actually tertiary amines, and their derivatives retain the exclusion of hydrogen from the first three valences of nitrogen, those which represent hydrogen of ammonia.

In their isomerisms and in their deportment, pyridine and quinoline resemble benzene and naphthalene, their simpler aromatic types. By the facility of substitution of methyl and other radicals for their hydrogen, they yield homologous series ; by oxidation of the alcohol radicals, carboxylic acids are obtained ; and by reduction of the acids, the original compounds are restored. In a very important quality, however, pyridine differs from benzene in deportment, that the former gives much more stable addition products with hydrogen than can be obtained from the latter. Two, four or six atoms of hydrogen are united. Hexahydropyridine is the alkaloid piperidine. Piperidine in union with piperic acid constitutes the piperine of black pepper, the latter being, therefore, a saponifiable alkaloid. The pyridine from which is derived tropine, the central group in solanaceous alkaloids, is tetrahydrated, and the typical quinoline in the cinchona alkaloids is tetrahydrated. The stability of these addition products renders possible the great complexity of natural derivatives of pyridine. And in this capacity for larger combinations we have proof, again, that *the chemism of nitrogen* introduces distinct character into the pyridine derivatives.

Pyridine was obtained from bone-oil in 1850, from coal-tar in 1855, by synthesis from an azo compound in 1865, and may be prepared from various alkaloids by distilling them with alkali. A pungent liquid, miscible with water, boiling at 116·7° C., its appearance scarcely commends its claim to be the chemical protoplasm of the alkaloids of plants. Quinoline was obtained from quinine and from strychnine in distilling with alkali, by Gerhardt in 1842, from the later distillates of coal-tar as finally confirmed by Hoogewerff in 1883, from bone-oil, along with pyridine, and by synthesis in several ways, best from nitro-benzene with aniline and glycerine as done by Skraup in 1881. As a liquid it corresponds in appearance as it does in composition to pyridine, being heavier and less volatile. It is easily oxidized to pyridine dicarbonic acid, as naphthalene is to phthalic acid,—as by the cutting away of one of a pair of joined hexagons. When manufactured from cinchonine, quinoline is accompanied by lepidine;* as prepared from nitrobenzene it is liable to retain the latter as an impurity. It is in demand for colour manufacture, and for introduction to medicinal uses. Pyridine is still prepared from bone-oil, but should much demand arise for it, more favourable sources would doubtless be found.

About eight years ago the researches of many chemists reached the discovery of the *pyridine type* of constitution in several groups of the vegetable alkaloids. In some instances, as in the chief cinchona alkaloids, results have established a rational aromatic formula for the entire base as it exists in nature. In other instances the pyridine type has been revealed, not at first in the natural alkaloid as a whole, but in an alkaloid previously found to lie within the alkaloid of nature, and obtained therefrom by reactions fairly denoted as those of saponification. And before bringing up examples of the pyridine and quinoline types of constitution, it is necessary to summarize the principal saponifiable alkaloids, with the products into which they split up.

* Kekulé, 'Constitution of Aromatic Compounds,' 1865 : *Bull. Soc. Chim.*, Jan. 27 : *Ann. Chem. Phar.*, cxxxvii., 129 ; 'Lehrbuch der Org. Chem.,' II. 491–518.

† "Aromatic Constitution of Pyridine and Quinoline," Koerner, 1870. Baeyer, 1870 : Liebig's *Annalen*, 154, June ; 155, Sept. ; *Ber. d. Chem. Ges.*, xii., 1320. Dewar, 1871 : *Chem. News*, 23, 40. Ladenburg's 'Handwörtenbuch der Chemie,' I. 535.

‡ *Ber. d. Chem. Ges.*, xvi., 1609 and xvii., 1521. Ladenburg, *Ibid.*, xvi., 2063. Bernthsen, *Ibid.*, xvi., 1808.

* For the manufacture of cyanine, the lepidine is necessary, pure quinoline not yielding this blue colouring matter in treatment with amyl iodide and alkalies (Hoogewerff and Van Dorp, 1882).

The saponification of alkaloids, as accomplished in the last thirty years corresponds, in its delightful simplification of complex compounds, to the saponification of fats achieved over fifty years ago,—with this striking difference, that the chief or representative product of the saponification of an alkaloid is another alkaloid, while the more elaborate product of the saponification of a fat is usually an acid. Indeed, in case of an alkaloid its saponification may be defined as the removal of an acid or other radical by replacing it with hydrogen. And the saponification of alkaloids does not fulfil the accepted definition of chemical saponification, in that its resulting base in most cases does not appear in classification as an alcohol, nor is the subject of the decomposition classed as an ester. The saponification of alkaloids is instituted by action of an alkali then left in union with the resulting acid, or by an acid then left in union with the obtained new alkaloid, or by digestion with only water, which of course is always taken up. The following are representative instances of the saponifications of alkaloids :—

Atropine with *water* yields *tropine* and *tropic acid.**

$C_{17}H_{23}NO_3 + H_2O = C_8H_{15}NO + C_9H_{10}O_3$

Aconitine with *water* yields *aconine* and *benzoic acid.*†

$C_{33}H_{43}NO_{12} + H_2O = C_{26}H_{39}NO_{11} + C_7H_6O_2$

Cocaine with *water* yields *benzoyl-ecgonine* and *methyl-alcohol.*‡

$C_{17}H_{21}NO_4 + H_2O = C_{16}H_{19}NO_4 + CH_4O$

Benzoyl-ecgonine with *water* yields *ecgonine* and *benzoic acid.*

$C_{16}H_{19}NO_4 + H_2O = C_9H_{15}NO_3 + C_7H_6O_2$

Narcotine with *water* yields *hydrocotarnine* and *meconine* §

$C_{22}H_{23}NO_7 + H_2O = C_{12}H_{15}NO_3 + C_{10}H_{10}O_5$

Cevadine with *water* yields *cevine* and *methylcrotonic acid.*‖

$C_{32}H_{49}NO_9 + H_2O = C_{27}H_{43}NO_8 + C_5H_8O_2$

Veratrine with *water* yields *verine* and *veratric acid.*‖

$C_{37}H_{53}NO_{11} + H_2O = C_{28}H_{45}NO_8 + C_9H_{10}O_4$

Piperine with *water* yields *piperidine* and *piperic acid.*¶

$C_{17}H_{19}NO_3 + H_2O = C_5H_{11}N_9 + C_{12}H_{10}O_4$

Each reaction of saponification here cited is limited to the single step taken in the appropriation of one molecule of water.** In the case of cocaine a second saponification directly follows the first, and treatment may yield together the products of both reactions.

After Chevreul effected the saponification of ordinary fats, it was a long time before the reverse change was obtained in the synthesis of fats from fatty acids and glycerine. But not so long an interval interposed between the analytic and synthetic results represented by the saponification of some of the alkaloids. The construction of atropine by union of its saponification products was brought about by Ladenburg in 1879.†† The like synthesis of cocaine was obtained by Skraup, and by W. Merck in 1885.*

The liability of alkaloids to saponification is a property that closely concerns the treatment they receive in manufacture and in pharmacy, and gives explanation of numerous perplexities in practical operations. These very perplexities have sometimes been assumed to show that results promised by theory fail to appear in practice,—a failure that finds remedy in this case, as in many others, by a more liberal use of just the theoretical knowledge complained of. At all events, the operations of pharmacy have been the source of unnumbered contributions to the pure chemistry of the alkaloids, and this indebtedness of science pays honour to faithful investigation, represented in a rich and extensive body of pharmaceutical literature.

Returning to our inquiry into the discovery of the pyridine type of aromatic composition in the alkaloids, we find the last three years to have been a period of great attainment. It may be placed first that tropine, the common base of the entire atropine group of alkaloids, the mydriatic alkaloids of the solanaceæ, is itself a derivative of pyridine. This was experimentally established, in 1884 and 1885, by Ladenburg,† A. W. Hofmann, Hantzsch and Koenigs. In 1882 Ladenburg had termed tropine "a nitrogenous alcohol of which the tropeines are the ethereal derivatives." But after a succession of reports on the nature of tropine, beginning in 1881, Ladenburg has presented evidence fully confirmed by others just named, that tropine is directly derived from pyridine. Starting with tetrahydro-pyridine, the introduction of an ethylene-hydroxyl and a methyl, in place of two atoms of hydrogen, forms tropine :—

$C_5H_7(C_2H_4OH)N(CH_3)$.

Piperidine, the decomposition product of the alkaloid of black pepper, was shown by Hofmann in 1879 and by Ladenburg and Roth in 1884‡ to be a hexahydropyridine. Nicotine, the volatile alkaloid of tobacco, is a dihydro-dipyridine, as claimed in 1880 by Wischnegradsky.§ Conine, early classed as a secondary amine, is ascertained to be a propylpiperidine.‖

The alkaloids of cinchona barks, though counting over twenty-five in number, are certainly represented in their constitution by cinchonine, of which quinine is the oxymethyl derivative.

In 1881, Wischnegradsky deduced from his results that cinchonine contains both a quinoline and a pyridine group, but accumulating proofs since render it strongly probable, if not certain. that cinchonine is a quite simple di-quinoline derivative.¶ Starting with quinoline, then tetrahydrated, two molecules unite by dropping a hydrogen from each, when oxymethyl is made to replace one hydrogen for cinchonine, or two hydrogens for quinine.**

* "The Saponification of Atropine," Pfeiffer, 1863: *Ann. Chem. Phar.*, cxxviii., 273. Kraut, 1863: *Ann. Chem. Phar.*, cxxviii., 280; cxxxiii., 87. Lossen, 1864-8: *Ann. Chem. Phar.*, cxxxi., 43; cxxxviii., 230; cxlviii., 236.

† "Saponification of Aconite Alkaloids," C. R. A. Wright with others, 1877-79: *Jour. Chem. Soc.*, xxxi, 143; xxxiii., 151, 318; xxxv., 387, 399; *Phar. Jour. Trans.*, [3], viii., 164, 167. Mandelin, 1885: *Archiv d. Phar.*, [3], xxvi., 97, 129, 161. Juergens, 1885: *Phar. Zeitsch. Russland.*

‡ "Saponification of Cocaine," Lossen, 1865: 'Dissertation.' Wœhler and Lossen, 1865: *Ann. Chem. Phar.*, cxxi., 374; cxxxiii., 352.

§ "Decomposition Products of Narcotine," Wright, 1876-7: *Jour. Chem. Soc.*, xxix, 461; xxviii., 573; xxxii., 525.

‖ "Products of Veratrin (Cevadin)," Wright and Luff, 1878: *Jour. Chem. Soc.*, xxxiii., 338.

¶ "Saponification of Piperine," Babo and Keller, 1857: *Jour. Prakt. Chem.*, lxxii., 53. Strecker, 1858. *Ann. Chem. Phar.*, cv., 317. "Piperidine by Dry Distillation," Wertheim, 1849: *Ann. Chem. Phar.*, lxx., 58.

** According to Wright, japaconitine, with three molecules of water, yields two molecules each of japaconine and benzoic acid.

†† "Synthesis of Atropine from Saponification Products," Ladenburg, 1879-82: *Ber. d. Chem. Ges.*, xii., 941; xiii., 104, 2041; xv., 1028.

* "Formation of Cocaine from its Decomposition Products," Z. H. Skraup, 1885: *Monatsch. Chem.*, vi., 556; *Jour. Chem. Soc.*, xlviii., 1249. W. Merck, 1885: *Ber. d. Chem. Ges.*, xviii., 1594.

† "Derivation of Tropine from Pyridine," Ladenburg, 1881-1885; *Ber. d. Chem. Ges.*, xiv., 227, 1342; xvi., 1408; xviii., 1587, 2967; *Ann. Chem. Phar.*, ccxvii., 74; *Jour. Chem. Soc.*, xliv., 670; xlvi., 760; xlviii., 565, 992.

‡ "Constitution of Piperidine," Hofmann, 1879; *Ber. d. Chem. Ges.*, xii., 984. Ladenburg and Roth, 1884; *Ibidem*, xvii., 513; *Jour. Chem. Soc.*, xlvi., 1202.

§ "Constitution of Nicotine," Wischnegradsky, 1880; *Ibidem*, xiii., 2315.

‖ "Constitution of Conine," A. W. Hofmann, 1881; *Ibid.*, xiv., 705. As a secondary amine v. Planta and Kekulé, 1854; *Ann. Chem. Phar.*, lxxxix., 129. Ladenburg, 1887; *Ber. d. Chem. Ges.*, xix., 439.

¶ "Constitution of Cinchona Alkaloids," Wischnegradsky, 1881; *Bull. Soc. Chim.*, [2], xxxiv., 334; *Jour. Chem. Soc.*, xl., 444. Koenig, with others, 1883-85; *Ber. d. Chem. Ges.*, xvi., 727; *Jour. Chem. Soc.*, xliv., 1143. Michael, 1885; *Am. Chem. Jour.*, vii., 182.

** $C_9H_{10}NC_9H_9N(O.CH_3)$, cinchonine.
$C_9H_{10}NC_9H_8N(O.CH_3)_2$, quinine.

This is by no means an account of the pyridine type as known in all the alkaloids. Strychnine and brucine are the subjects of especial activity, and it is clear that they are pyridine compounds, as are also the alkaloids of opium.

The evidence seems to be, at present, very strong, that, in general terms, the vegetable alkaloids are hydrogenized pyridine derivatives. Under the belief that any useful understanding of the structure of these bodies must be based upon a full experimental acquaintance with the pyridine and quinoline series, there is great activity in the study of the typical compounds. For some time now, researches have been undertaken to find the position of groups introduced into these bodies. On the success of these studies of chemical position, the chemistry of the natural alkaloids will in the future necessarily depend. Until the isomerisms due to position are under control, there can be no distinction established between, for example, numbers of compounds, each having the same constituent groups represented in the present formula for quinine, or in that for atropine. Also the present acquaintance with plant bases, accumulated in the progress of analytical chemistry, has still to be advanced, as a foundation for studies of chemical structure.

General methods of synthesis of pyridine derivatives have been sought at many hands. The reaction of A. W. Hofmann, beginning with alkyl iodide addition products, on subsequent exposure to a high temperature in sealed tubes, results in the substitution of radicals in pyridine compounds. The production of the hydrogen addition compounds, as piperidine, is effected only by the strongest of reducing agents, such as metallic sodium applied in alcoholic solution.* This affords another illustration, that the most violent reducing agencies of the laboratory are required to accomplish changes constantly carried on by the silent forces of plants.

At the present time, there appears a degree of encouragement that the synthetic manufacture of the alkaloids hitherto obtained from plants will sometime become realized as an industry. Not from the chance efforts of ignorant dreamers, nor from any premature short-cuts of special attempt, but, if at all, from the well-earned progress of the science of the world, will these results be accomplished.

A large amount of well directed chemical investigation, in the service of manufacturing interests, is devoted to reasonable questions of new production of alkaloids—including the conversion of those more abundant into those more valuable. Artificial alkaloids of a composition allied to natural ones are being constantly put upon trial as respects their usefulness in medicine and the arts. The periodicals of pharmacy and medicine are thickly strewn with records of the physiological power of new alkaloids, especially of quinoline derivatives of many forms, "kairines," "thallines," and "antipyrines," ethyl morphine, and methyl and ethyl strychnine. It should not surprise us, if, at any time, artificial alkaloids should assume a commercial importance rivalling that of articles already brought into general use, such as carbolic and salicylic acids.

IV. New Azo and Diazo Bases.

It was said that the nitrogen of organic bases in general, whether of the pyridine type or otherwise, still conforms to the type of ammonia, preserving the valence and the character so well known in ammoniacal compounds. To this statement perhaps an exception should be made, as it does not apply to the diazo compounds. However, the diazo compounds are not distinctively bases, but act both as bases and as acids. The azo compounds, acting alone, are scarcely bases at all, but in conjugation as azo-amido compounds they unite with acids to form salts, and such salts owe much of their character to their azo-nitrogen. The nitrogen of the class of azo and diazo compounds as a whole is nitrogen acting in a way intermediate between that of the basal nitrogen of the ammonia type and acidulous nitrogen of organic nitro-acids. And so far as they represent bases, the diazo and azo types of structure must be taken into account, in a survey of the base-forming activities of nitrogen.

The diazo compounds were produced* shortly before the date of Kekulé's lucid theory of aromatic chemistry; the azo compounds were obtained† much earlier; but both classes of substances were seen through definite rational formulæ after 1865.‡ The diazo group contains two atoms of nitrogen so interlinked that the group serves, with a valence of only two, to connect the benzene group on one side with an acid or metallic radical on the other side. Diazo compounds are very frail, readily breaking up with explosive violence, due to the liberation of free nitrogen. The azo compounds, less instable, have the same bivalent group of two nitrogen atoms, here interposed between two benzene rings. Whatever be the truth as to the valency of nitrogen in the diazo group, it is impossible to avoid thinking that the two atoms are united to each other by two valences of each: $(-N=N-)$. This structure, at all events, is wholly unlike that of the ammonia type, but bears some resemblance to that of isocyanogen.

Almost innumerable colour compounds of the azo and diazo formation have been manufactured from coal-tar materials, but not until now (to the writer's knowledge) has the azo type been discovered in immediate relation to natural organic products.

This year Dr. V. C. Vaughan, from further work upon the albuminoid decomposition product tyrotoxicon§ has announced the identity of this body with diazobenzene,‖ and says: "We think it highly probable that diazobenzene or some closely allied substance will be found in all those foods, which, from putrefactive changes, produce nausea," etc. The same author gives his conviction, that diazobenzene, and possibly allied bodies, are "transition products of putrefaction."

The study of albuminoid constitution has scarcely been entered upon as yet with advantage, and the relations of albuminoid nitrogen may yet add new chapters of the highest interest in the history of this element. It has been deemed highly probable on certain experimental data, that albuminous substances, like alkaloids, are built up through the transition of the pyridine compounds. On evidence just cited it may appear that the same bodies are broken down through the transition of the diazo compounds. Whatever may be in reserve for future chemistry, to come from the study of the proteids of food, its importance is sure to belong, in greater part, to the chemistry of nitrogen.

In the brief and inadequate review now concluded, an early mention was made of those first two steps that counted so much then for progress, the making of methylamine by Wurtz, and the proof of primary and secondary amines by A. W. Hofmann. Of these workers, the one died only three years ago, and the other is living as an active promoter of science. The advances made in the lifetime of these men brings a deep sense of gratitude to the heart of every chemist. We pay honour to them for the good works they in their lives have done, and we have been grateful with them for the rich and beneficent fruits they in their lives have seen.

* "Formation of Hydrogen Addition Products." Ladenburg, 1881: *Ber. d. Chem. Ges.*, xvii., 156.

* "The Origin of Diazo Compounds," Griess, 1858-66: *Ann. Chem. Phar.*, cvi., 123; cxiii., 201: cxxi., 237; cxxxvii, 39.

† "The Origin of Azo Compounds," E. Mitscherlich, 1834: *Ann. Chem. Phar.*, xii., 311. A. W. Hofmann, 1860: *Ann. Chem. Phar.*, cxv., 362.

‡ Kekulé's 'Lehrbuch der Organ. Chem.,' 1866, II. 688, 703. Ladenburg's 'Handwörterbuch,' 1884, I. 116 (Heumann); II. 192 (O. Jacobsen).

§ "Tyrotoxicon," Vaughan, 1884-86: *Zeitschr. f. Physiolog. Chem.*, x., 146; *Jour. Analyt. Chem.*, i., 24.

‖ *Jour. Analyt. Chem.*, i., 281.

The Pharmaceutical Journal.

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DEATH BY POISON.

THE publication of the Registrar-General's annual report again affords an opportunity of directing attention to the actual facts obtaining in regard to the degree of danger attending the accidental or intentionally improper use of poison. The statistics for the year 1886, which have just been made public, present a still more favourable character than those for the preceding year. The total number of deaths from violence was in 1885 remarkably small as compared with previous years; in 1886 there has been some increase in this respect, the actual figures being 17,425 as against 17,268. There has been, however, a marked improvement as regards the actual number of deaths caused by accident or negligence in the use of poison during 1886, the number of such cases being 329 as against 343 in 1885; so that the deaths thus caused during 1886 do not amount to more than 2·21 per cent. of the entire number of deaths by accident, or even less than it was in the preceding year, when the total number of violent deaths was abnormally small. This continued progressive reduction in the number of deaths due to accident or negligence in the use of poison, clearly furnishes evidence of the beneficial influence that has been exercised by the legislative enactments intended for confining the sale and supply of poisons to persons qualified to perform those functions without danger to the public. In the case of deaths by poison, which are classed under the head of suicide, there is also a like improvement recognizable. In 1886 the deaths by suicide were in excess of those during the preceding year, and as there was no increase in the actual number due to poison the percentage was only 12·42 as against 13·95 in 1885. Taking the entire number of deaths by poison during 1886 they do not amount to more than 3·5 per cent. of the total deaths by all kinds of accident, negligence and suicide.

These facts show unmistakably that so far as public safety is concerned the danger to be apprehended from poison is, on the whole, but small as compared with other causes of death by accident or negligence, and even by suicide or homicide. But when we come to examine the details of the recorded instances of death by poison, there is striking evidence that there is still room for effecting a very considerable reduction in the number of cases that do occur. On previous occasions attention has been directed to the actual and relative infrequency of poisoning with poisons which are made subject to the more stringent provisions of the Pharmacy Act. Prussic acid, arsenic, and strychnine do not figure as the cause of death except in a few isolated instances, and if we exclude from consideration opium and allied narcotic preparations it appears that the majority of deaths by poison, whether suicidal or accidental, are caused by articles that can be obtained at any oil shop even by young children, and that in many cases without any label or other indication of danger to be apprehended from their misuse. Chief among these articles which swell the list of deaths by poison are carbolic acid and the several strong mineral acids. These are stated in the report of the Registrar General to have been the causes of death in no less than 34 per cent. of the suicides by poison, and in upwards of 10 per cent. of the cases of poisoning by accident or negligence. This shows a marked increase upon the proportion in which the misuse of those articles was attended with fatal consequences, according to the returns of the preceding year, and it appears to indicate that, notwithstanding the utility of the articles in question as disinfectants, and for various other domestic and technical purposes, there is need of some restriction upon their sale to provide against the risk of misuse by accident or negligence.

Besides the class of articles just mentioned, and those of a narcotic nature, which are jointly the most frequent cause of death by poison, there are as usual a number of other articles mentioned as having been the cause of death in isolated instances, both of accident and suicide. Under the head of accidental deaths no less than ninety-five are attributed to poisoning by lead, including painters' colic. Only three cases are recorded in which death was caused by an overdose of medicine. Accidents with vermin killer or strychnine have occurred in only seven cases, but there have been no less than thirty-seven cases of suicidal and homicidal poisoning with those articles. It is also remarkable that the number of accidental deaths attributed to opium and its narcotic preparations is more than double the number of suicidal deaths from the same cause, and this fact appears to have some significance in connection with the large number of such preparations that are sold as patent medicines.

A legacy of £19 19*s.* 0*d.* to the Benevolent Fund, under the will (proved January 22, 1872) of the late Mr. Edward Arnold, chemist and druggist, of Norwich, which was dependent upon the death of the widow of the testator, has just been received, that lady having died in January last.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, January 5, when a paper on "Micro-Fungi" (illustrated by slides) will be read by Mr. W. Wyatt, and a Report on Practical Pharmacy will be given by Mr. F. C. J. Bird.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at 103, Great Russell Street, on Thursday, December 15, Mr. T. S. Dymond (President) in the chair.

The minutes of the previous meeting having been read and confirmed, the President called upon Mr. T. A. Ellwood to read his paper entitled—

Further Investigation on the Official Liquid Fixed Oils.

BY T. A. ELLWOOD.

In a previous paper before this Association, on the above subject, I only dealt with four out of the six oils contained in the British Pharmacopœia, having left the oils of croton and cod liver. These two form the subject of my paper this evening.

My examinations have been conducted in much the same manner as last year; but as the processes are fully detailed in that paper,* as printed in last year's Proceedings of the Association, I shall now omit them, describing any additional processes I have used more fully. The vastly different composition of these two oils has rendered it necessary to use more exhaustive treatment.

Croton Oil (oleum crotonis vel oleum tiglii). This oil is obtained by expression from the seeds of *Croton Tiglium*, a plant belonging to the natural order Euphorbiaceæ, and indigenous to the Malabar coast of India. When expressed the seeds yield 50 per cent. of oil.

This oil has long been used medicinally for its purgative principles, originally being imported from India; but owing to its very doubtful purity, the seeds are now imported and the oil is mostly expressed in England by the wholesale druggists or oil merchants, and hence the genuineness of the article is insured to the extent that we individually confide in these wholesale houses.

The Indian and English expressed oils vary very considerably in appearance and also in therapeutical effect, so no doubt we are right in placing doubtful confidence in the imported oil.

The *Indian oil* is of a pale yellow colour, not fluorescent, and but slowly oxidising to resin on exposure to atmospheric action. Subjected to a freezing mixture it becomes turbid throughout its whole volume, and then separates into two portions, the upper stratum being clear and viscid, the lower containing granular fatty masses.

The *English oil* is much darker, approaching a sherry colour; it is more viscid, more readily resinifies by exposure, and subjected to a freezing mixture deposits the granular portions of fat more slowly and does not previously become turbid throughout the whole volume but only towards the bottom of the oil. It is distinctly acid to test paper, slightly fluorescent, and of an acrid taste and rancid odour.

We cannot class croton oil with the drying oils, although several of its properties and characters would indicate its analogy. Its composition is more in harmony with the non-drying oils, and is very complex, consisting of the glycerides of palmitic, stearic, lauric and myristic acids, together with crotonolin and volatile ethers of the fatty series and numerous isomers.

As this oil possesses two different therapeutical agents, or produces two differing effects, cathartic and rubefacient, we may naturally infer that it contains two different principles, each possessing one of these properties.

It was, some few years ago, suggested by Bucheim that the activity of croton oil was due to an acid he called crotonoleic, but he was unsuccessful in his endeavours to isolate it. I shall refer to this again later in my paper.

In a paper read before the Pharmaceutical Society by Mr. H. Senier (*Pharm. Journ.*, Dec., 1883, p. 446), he describes a method of dividing the oil into two parts, one containing the vesicating, and the other the purgative principles. It was by means of alcohol. He does not decide, however, what percentage should compose each of these parts, and hence in so complex an oil as croton we can understand that according to the extent of oxidation so would be the amount soluble in alcohol, and results in this direction would vastly differ. Such, too, is the case, to such an extent, that no reliance can be placed upon the alcohol dissolving power.

I have tried methods for obtaining the oil in different states of oxidation. This I did by putting samples of oil into wide-mouth bottles and tying over with muslin, to prevent extraneous matter getting in, and frequently agitating; by this treatment it oxidised much more rapidly than when stored in the usual tightly corked or stoppered bottles. I should like here to suggest that as the activity of the oil differs according to the amount of oxidation, we ought to officially have some data as to the amount of resin it should contain, or some test whereby the amount of oxidation can be approximately ascertained.

Solubility in Alcohol.—In accordance with the statements of Senier, in the paper before referred to, I tried the action of alcohol on different samples of the oil, and found that as a solvent it varied very considerably, some oils being entirely soluble in five parts, the solution remaining permanent; some separated into two portions, after long standing only; whilst others were only partially soluble, there being two distinct layers immediately. I was led to consider this peculiarity due to the amount of free acid, rather than the extent of resinification; so some of my exposed samples were taken and titrated for the amount of free acid with a decinormal soda solution. The neutralized portion was separated, and the remainder shaken with alcohol, when the proportion soluble was considerably less than previous to neutralizing. On evaporating the alcohol, a resinous substance remained still containing some of the vesicating principle.

On reverting to the separated soda salt obtained in titration, upon evaporation and treatment with dilute sulphuric acid a fatty acid separated, soluble in alcohol, and on partial evaporation of the alcoholic solution, traces of the vesicating property of the oil were discovered by a physiological test; but the portion of the oil insoluble in alcohol I also found retained some of these properties.

A few of the samples of oils I worked upon fully accorded with Senier's views and discoveries, but others so widely differed that I am led to draw the following inferences from the average behaviour of the samples I investigated:—

1st.—The vesicating principle may exist partially in the free state and partially in the state of glycerides soluble in alcohol.

2nd.—That the amount of free acid other than crotonoleic influences its solubility.

3rd.—That the amount of free fatty acids is in direct proportion to the amount of oxidation the oil has undergone.

4th.—That in proportion to the extent of oxidation so is the solvent power of alcohol upon the vesicating property.

In *Journal of Society of Chemical Industry*, July, this year, is an extract from a paper by Kobert,* differing from Senier, and ascribing both the purgative and rubefacient action of the oil to the crotonoleic acid of Bucheim; my investigations incline me to doubt that statement, as I find that a considerable proportion of the aperient principle is not removed by the process for extracting the acid, which is as follows:—

Treat the oil under examination with an excess of hot saturated solution of baryta in a water-bath for some time, keeping it free from atmospheric action. Collect the precipitated barium salts, and wash thoroughly with successive portions of cold distilled water in a stoppered

* *Pharmaceutical Journal*, [3], vol. xvii., p. 517.

* *Pharmaceutical Journal*, April 30, 1887, p. 881.

bottle, decanting the aqueous solutions. Dissolve out the portions soluble in ether, distil off the ether at a low temperature, and exhaust the residue with alcohol; this dissolves the crotonoleate of barium. Distil off alcohol, and pour into dilute H_2SO_4; the barium is precipitated as sulphate, and the crotonoleic acid liberated. Thus prepared it is of a brown colour, remaining liquid at ordinary temperatures, possesses powerful vesicating, and also slight purgative properties. I am inclined to think this not a simple acid, but a combination of two or more. I have not, however, as yet, devised a means of separating them, but think that when a method is obtained it will be found that one is the purgative and the other the rubefacient. Further, I think that the barium salt of the purgative principle is only partly soluble in alcohol.

My next investigation was to ascertain whether the salt soluble in ether, but not removed by alcohol, contained either of the active principles; but on liberating the acids and using physiological tests I found such was not the case, the acid in its character resembling oleic, which no doubt it was.

My next investigation was upon the alcohol or glycerol produced by saponification, but this I found to be entirely free from both purgative and vesicating properties.

Owing to the short time I have had for the preparation of this paper, many investigations I hoped to conduct have been necessarily omitted, and hence I can only say that the purgative principle is amongst the fatty acids; that its salts are only slightly soluble in ether or spirit, and that its action is intensified if in presence with the glyceryl radicle. I hope at some future time to lay before this Association some further investigations upon this point.

Now I will mention a few of the characteristic tests for croton oil, following the same lines as those I adopted last year.

Specific gravity (0·940–2).—This seems to be considerably affected by age, owing doubtless to the absorption of oxygen.

Action of Strong Acids.—HNO_3 of sp. gr. 1·38. This acid had no evident action upon the oil in any proportion whatever, when applied upon a white plate, or upon shaking them together in a test tube in equal proportions; but on standing twenty-four hours the acid had materially affected the colour of the oil, it being of a deep claret, whilst the acid itself assumed a straw colour.

H_2SO_4.—This acid, in any proportion, immediately charred the oil, passing from a red through chocolate to black, the chocolate appearance being very characteristic.

HCl, sp. gr. 1·16.—This acid did not affect it immediately when mixed in equal proportions, but after standing twenty-four hours the oil had assumed a reddish brown colour, which in another day or two passed to a black, leaving the acid of a claret colour, a little lighter than the oil of HNO_3.

H_3PO_4, sp. gr. 1·5.—Shaken together in equal parts it seemed to be miscible, forming a viscid liquid of a pale yellow colour, and upon standing some time they only partially separated, an emulsion apparently being formed.

Glacial Acetic Acid completely dissolved it, croton oil resembling castor oil in that particular.

Free Fatty Acid.—This, as I have previously said, varies considerably according to age, and upon shaking up with alcohol, and titrating with decinormal NaHO solution, using phenol-phthalein as an indicator, I found it to vary from 1 per cent. obtained in nearly fresh oils, up to 6 per cent. and 8 per cent. in the oils oxidised by exposure as described.

Combined Fatty Acids.—These I have already referred to, but owing to their complex nature, did not think it advisable to further study them. The soap produced was very brown in colour, rose to the top of the liquid in a hard cake, leaving the mother-liquor nearly black, decolorized, however, by the action of acids. The blackening was probably due to the presence of resin.

Croton oil, like the drying oils, is not solidified by the elaidin test.

Bromine Absorption.—The average absorption, working upon four samples of oil, two of which were nearly fresh, and the others my oxidised samples, was 42·5 per cent. The process was very tedious, owing to the slow absorption of the halogen, the complete titration taking a week, it being requisite to allow the oil to stand twenty-four hours after each addition of bromine.

Adulterations.—I have found it difficult to tell whether the oil is adulterated to any appreciable extent. Its total solubility at ordinary temperatures in glacial acetic acid will ensure the absence of most of the commoner oils. Its easy saponification with caustic potash will detect the presence of mineral oils. The most likely adulteration is castor oil, which cannot be detected by either of these reactions. The higher sp. gr. of castor oil will, however, afford one means of ascertaining its presence.

Detection of Croton Oil in Mixtures.—Shake up the mixture with alcoholic caustic potash, separate the alcoholic layer, add dilute acid, and distil off the spirit. Dissolve the liberated fatty acid in ether, evaporate the ether, and try the physiological effects upon the skin; if after a few hours the pustular eruption and characteristic rubefacient effect is produced, the presence of croton oil is proved.

Cod Liver Oil (oleum morrhuæ vel oleum jecoris aselli) is obtained by pressure from the livers of several species of cod, the chief source being *Gadus Morrhua*. Nearly all the cod liver oil used in England comes from the fishing stations of Norway and Sweden, whilst a little comes from the Newfoundland fisheries.

The fresh livers are heated to a temperature of about 82° C., and then subjected to pressure between folds of calico or linen, or the broken up livers are exposed to the sun in wicker baskets, when the oil exudes and is collected; by these processes is obtained the pale, or virgin oil, which is further purified from higher fatty acids, by freezing and straining.

The livers are then subjected to a greater heat by boiling in water, when more oil can be obtained by expression, or it will float upon the water and is drained off. This oil contains extractive matter, and is of a pale brown colour, being the light brown cod liver oil of commerce.

If now the livers are further allowed to lie in heaps until they begin to ferment, or if stale livers are taken, by expression with heat a much darker oil exudes, forming the dark brown cod liver oil, which contains a great deal of extractive matter and fatty bodies, without at the same time increasing its therapeutical value.

It is now almost universally admitted that the pale oil is the best for use, for whilst containing all the therapeutical value of the darker oils, it is more palatable, more easily retained by the stomach, and in every degree pharmaceutically more elegant.

Characters.—It should be transparent at ordinary temperatures, of a pale yellow colour, limpid, with but a slight fishy odour and taste. Should not deposit crystals of fat on exposing to a freezing mixture, and should be soluble in all the ordinary solvents for fixed oils, and have a faintly acid reaction.

Action of Alcohol.—Not more than 2½ per cent. is soluble in alcohol, the amount increasing according to the colour; in the darker oils I have found as much as 8 per cent. soluble, which, upon evaporating off the spirit, left a greasy extractive possessing a very strong fishy odour. If the cod liver oil be shaken with an aqueous solution of normal carbonate of soda, strength about 5 per cent., this will neutralize the free fatty acids, and if after separating them from the oil (which must be dried by heating some time to a temperature of about 110° C., and then allowed to cool) the solvent power of alcohol be tried, some of the oil will still be found soluble, proving that some property beyond the free acid is removed by alcohol.

If this solution be subjected to gentle distillation a

fishy extractive is left, to which the name morrhuol has been assigned ('Year-Book Pharmacy,' 1886, p. 234), and which is said to be the active principle. I am not, however, prepared to accept this statement, as it would make the darker oils more valuable and active than the light, since they yield about 4 per cent. extractive with about 1·5 per cent. in the pale oils. This extractive has an acid bitter taste, contains iodine and bromine, but otherwise the oil seems to lose nothing through its absence.

Composition.—The oil is a mixture of the usual fatty acids which Winkler asserts are in combination with the propyl radicle, but I say most certainly they cannot be entirely connected with that base, since it being a monad radicle and glyceryl a triad, the saponification would at once make it manifest. I am inclined to think that the halogens are present in combination with propyl, since the above alcoholic extractive treated with ammonia gas gives off so strongly the characteristic odour of propylamine. When iodine was discovered in the oil in 1837, it was supposed to be in combination with potassium, but that was afterwards declared to be improbable, owing to its insolubility in alcohol. I, however, have found a portion is soluble in alcohol, as previously described, especially in the case of the dark oils; but, nevertheless, I do not think it is in combination with potassium, but as I have just said, an organic base. Of the halogens, chlorine is in greatest abundance; that, however, averages not more than about ·12 per cent., whilst the others average less than ·05 per cent.

De Jongh obtained from the oil a body he calls gaduin, and ascribes the formula ($C_{35}H_{46}O_9$). The following was his *modus operandi*. Saponify the oil with litharge, digest the resulting lead soap in ether which removes the oleate and the gaduin; decompose with H_2SO_4 to remove lead, treat the free acids with caustic soda, dissolve the soda soap in dilute alcohol, expose to temperature of 0°C., when the soap will be deposited. On the addition of H_2SO_4 to the solution the gaduin is obtained.

Upon working out this method, I obtained the body called gaduin, but was only able to identify oleic acid, and hence cannot confirm De Jongh's statement, and am inclined to doubt the existence of a simple substance of so complex a formula.

Characteristic Tests for Cod Liver Oil—Specific Gravity.—The different samples of oil of which I took the specific gravity varied slightly, the darker oils having a higher figure than the pale varieties, the former being about ·929 and the latter ·9265.

Exposure to Cold.—The *brown oils* when exposed to a temperature produced by the mixture of sulphate of soda and hydrochloric acid did not give any deposit of fat, but became more opaque and turbid, their viscosity considerably increasing.

The *pale oils* when similarly exposed gave a precipitate of fat, which was white and crystalline, and upon collecting was found to be insoluble in ether. It presented the appearance of stearin, and on applying tests to the acid obtained by saponifying with caustic soda and treating resulting soap with dilute sulphuric acid and re-crystallizing from boiling alcohol, the average melting point was found to be 65° C. From this I conclude it is one or other of the stearins, or perhaps a mixture of them with palmitin.

Action of Acids. Strong Sulphuric Acid.—This acid, sp. gr. 1·78, gives with the oil upon a white slab a violet coloration, quite distinct, but transitory, quickly passing to a brown, and after standing some time nearly black. This peculiar characteristic effect of H_2SO_4 is due to the action upon the cholic acid, one of the normal constituents of bile, and is only indicative of the origin of the oil being the liver, which is physiologically the source or secreta of the bile. All other liver oils are similar in their reaction with H_2SO_4.

HNO_3., sp. gr. 1·4.—This acid applied in a similar manner to the above gives a purple colour passing to brown. This purple is quite a distinctive colour from the violet produced by H_2SO_4, and may be looked upon as a fairly reliable and characteristic test, since it does not give the same reaction with porpoise oil.

Free Acid.—This oil contains only traces of free fatty acids. I found out of six samples tested, being pale oils, only one exceeded ·5 per cent. when titrated in an alcoholic solution with centinormal soda solution. The darkest oil I found contained only 3·3 per cent.

Valenta's Acid Test.—On mixing equal parts of the oil and glacial acetic acid, and warming in an oil bath until solution is effected, then inserting a thermometer and observing the temperature at which the mixture becomes turbid, three trials gave 94°, 98° and 100° C. respectively, the average of these being 97° C. This test is very characteristic and will detect adulterations of sperm oil or shark liver oil.

Elaidin Test.—Cod liver oil does not solidify upon applying this test according to the method described by me in my paper last year; but upon standing twenty-four hours the solution becomes of a very characteristic blood red colour, still remaining liquid, and with a good deal of flocculent greasy sediment. Although this cannot be looked upon as a test, it is nevertheless useful comparatively, but will not detect the adulterations of fish oils.

Bromine Absorption.—This investigation, conducted as already described, shows the amount of bromine absorbed to be 80 per cent. I was unable to get the oil to absorb 83·9 per cent., which is the figure given by Dr. Mills. I will here mention that I used carbon disulphide in preference to carbon tetrachloride as a solvent for the oil, as I have found it answer better in all cases where fish oils are under examination. Perhaps the fact of using a different solvent may account for the slight difference we obtain, namely, about 4 per cent.

Tests for Cod Liver Oil in Mixtures.—The presence of this oil in others may easily be ascertained. The suspected oil is mixed with soda, lime and ammonic chloride, and then very strongly heated; the reaction of the lime upon the ammonia salt and the propyl salt present in cod liver oil cause the evolution of propylamine, which is at once detected by its very characteristic odour.

Test for Purity of the Oil.—Strong nitric acid is one of the best tests for the oil, as most adulterations cause it to give an immediate brown, instead of the characteristic purple of which I have just spoken.

In the 'Year-Book of Pharmacy,' 1886, page 234, is given another test, by means of which seal oil may be detected. It consists of shaking together equal parts of the oil and aqua regia, when, if pure, a dark green liniment should be formed, which becomes brown in half an hour, whereas if adulterated merely a pale yellow liniment is formed.

Many oils, including shark oil, may be detected by means of the sp. gr. being changed, or the viscosity considerably influenced.

Cod liver oil, too, seems to possess the property of retaining more water than most oils, and before taking the sp. gr., it should be dried and allowed to cool again. I have found this to cause a difference of ·002. The darker oils will retain more water than the pale.

There are several other little investigations I should very much liked to have brought before you, but I have been unable, from want of time, to fully carry them out, daylight being such a necessity in those needing colour reactions. I have, however, briefly laid before you the essential portions of my practical work, which, if not interesting to you pharmaceutically, may perhaps be chemically.

Owing to the complexity in constitution of all oily and fatty substances, there still remains a vast field for research in this direction. Especially will it be valuable to have some means or knowledge whereby we can detect, easily and quickly, any extraneous foreign matter or adulteration in the official oils.

When I gave the title of my paper for insertion in the programme of the first half of the current session, I had intended to extend my work to the oils of mace and theobroma, but owing to the unfinished investigations, I have deemed it expedient to defer for some future occasion any reference to them.

In conclusion, I must express my thanks to Mr. Philp for little services willingly rendered in helping me to conduct my researches.

The President referred to Mr. Ellwood's previous paper, and summarised its contents, remarking that the present paper was to be taken as a continuation of that, but not so fully worked out as the former one. The subject was a very important one, on account of the necessity of analysing oils in order to detect and recognize the adulterations which are now so prevalent. This required a thorough knowledge of these oils and their characters, as it is very difficult to detect adulterations at times. The tests of capability of forming emulsions, etc., are totally insufficient. It is almost impossible to detect and recognize unknown oils, even by Dragendorff's colour reactions, which are in pure samples very distinct, but are often confusing and misleading, owing to imperfect coloration, or indistinctness arising from a mixture of colours.

Mr. Moss mentioned Mr. Ellwood's reference to the different proportions of halogens in different samples of cod liver oil, and inquired whether the larger proportions were found in the light or the dark oils, as presumably the oil containing most halogens would be preferable for medicinal use.

Mr. Dymond asked whether Mr. Ellwood considered that cod liver oils freed from their separable constituents by cold, as is largely done to make the oils presentable in winter, are inferior medicinally to those which contain all their constituents. It was known that they are more palatable and digestible, but were they at all deteriorated by this process?

Mr. Ellwood, replying to Mr. Moss, said that he obtained rather more iodine, etc., from the dark oils than from the pale, but they all contain such small traces that the therapeutic action of the oils cannot be due in great measure to the halogens, but to the flesh-forming constituents. The difference in the amount of halogens in the light and dark oils would be perhaps one-millionth part of a grain per dose, which was not of much therapeutic value. In reply to Mr. Dymond, Mr. Ellwood stated that in his opinion the part separated by cold consisted of a mixture of stearins of little therapeutic value. Mr. Ellwood remarked that the subject of his paper was the official liquid fixed oils; he had only referred to other oils for comparative tests. He had intended extending the paper to include theobroma and nutmeg oils, etc., but had been unable to do so as yet. There were so very many oils now in the market, many of which were no doubt equal to those in pharmaceutical use, and hence there was a large opening for research work in this direction.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Thursday, December 15, Mr. William Crookes, F.R.S., President, in the chair, the following papers were read :—

An Apparatus for Comparison of Colour-tints. By Alfred W. Stokes.—In operations such as Nesslerising in water analysis, when it is necessary to compare a number of depths of tint with one another, it is very inconvenient to have to make up a large series of standard tints. The author has devised an apparatus which obviates this necessity. It consists of a base-board on which lies a sheet of white opal glass. Placed obliquely a little way above this is a sheet of glass on which rest the Nessler-tubes containing the solutions whose tints are to be compared. The mouth-ends of these tubes recline in grooves hollowed in a horizontal bar. This bar is supported by two pillars, on one of which slides a ring clasping a calibrated glass-tube; this tube has a side tubulure at the base, and is thus and by means of a short india-rubber tube connected with a similar but uncalibrated tube resting on the glass plate. A known quantity of the standard colour being placed in the tube carried by the ring and diluted with water up to the top mark, if the movable tube be raised this standard solution will flow into the tube resting on the glass plate. The movable tube is calibrated to show how much is present in the other tube. Hence, if a Nessler-tube containing liquid of unknown depth of tint be placed beside the tube on the glass plate, and the tube in the sliding ring be raised or lowered till the tints agree in the tubes resting on the glass plate, a simple inspection of the level of the liquid in the calibrated tube will give the quantity of standard colour the unknown solution is equal to. The apparatus is especially useful in Nesslerising; also in determinations of the quantity of lead present in waters; and in other cases where comparison of tint depths is necessary.

The Alloys of Copper and Antimony and of Copper and Tin. By E. J. Ball, Ph.D.—The author gives the results of experiments instituted with the view of obtaining further evidence as to whether the alloys Cu_2Sb and Cu_4Sb, which are indicated by changes in the direction of the curve by which the electrical conductivity of the copper-antimony alloys is expressed, are or are not compounds. Copper, antimony and lead were melted together in varying proportions, lead being a metal which alloys only to a very slight extent with copper. Mixtures of Cu_2Sb and lead were first made, the first alloy containing 95 per cent. of lead; the second 90 per cent. of lead; and so on for the remainder of the series. No alloys could be formed between the one with 20 per cent. and that with 65 per cent. of Cu_2Sb. The intermediate mixtures that had separated on solidification were all melted up together and allowed to cool slowly, with the result that owing to the partial oxidation and consequent loss of antimony in the successive fusions and castings, the metal was found to have separated on solidification into three alloys of different densities. The upper of these had the composition Cu_4Sb, the alloy which occupies the lowest position on the conductivity curve. The mixture of 75 lead and 25 Cu_2Sb, the first that separated after fusion, when cast in a cylindrical mould, separated on cooling into two concentric cylinders, the inner of which had the same composition as that of the last alloy that formed before the separation of the fused mixture into two alloys, *i.e.*, 80 lead and 20 Cu_2Sb. The author is of opinion that this represents the saturated solution of Cu_2Sb in lead. The alloys were then cast into discs, which were ground to the same size and examined by the aid of the Hughes' induction balance. The curve of relative conductivity so obtained was practically a straight line between the terminal points. In view of this fact, and since in their general appearance the alloys resemble both in colour and structure mixtures of Cu_2Sb and lead, it would appear that Cu_2Sb exists in these alloys as such. In the second series of alloys, the first mixture consisted of 95 antimony, 2·5 lead and 2·5 copper; the second of 90 antimony, 5 lead and 5 copper. These alloys were all more or less grey in colour, and their fracture became conchoidal as the alloy approached in composition Cu_4Sb. The induction balance curve rose gradually, till the copper and antimony were almost in the proportions necessary to form Cu_2Sb, and then fell again as this point was passed. In the third series, the first alloy formed contained 95 copper, 2·5 lead and 2·5 antimony; the second contained 90 copper, 5 lead and 5 of antimony. All the alloys of this series formed, except the one with 50 copper, 25 lead and 25 antimony; this separated on cooling into an alloy which was again found to have the composition Cu_4Sb and lead containing antimony and copper. The induction

balance curve of this series, allowing for the dilution of the copper-antimony alloys of lead, is identical with that of the copper-antimony alloys free from lead. Throughout these three series of alloys the lead appears to be wholly without influence on the physical properties except that which it exercises as a diluent, the influence of the alloys forming the turning points of the conductivity curve, Cu_2SB and Cu_4Sb being as marked in the presence of lead as when that metal is absent. Hence the author believes that these two alloys are true compounds. When they are fused with silver sulphide, the copper in both Cu_2Sb and Cu_4Sb is to a great extent displaced by silver, without greatly altering the character of the alloy. Copper-tin alloys were treated with lead in a similar manner, and in this case also the lead appeared to be without effect on the general character of the alloys, the influence of the alloys, which are indicated by the turning points of the conductivity curve, viz., Cu_3Sn and Cu_4Sn, being as marked as in the case of the turning points of the copper-antimony alloys Cu_2Sb and Cu_4Sb.

Professor Roberts-Austen said that the alloy of copper and antimony known as the "Regulus of Venus" is the only alloy having an intense violet colour, which made it an object of great interest to the alchemists, but it had been strangely neglected by their successors in modern times. Lead unites readily with antimony, and it therefore appeared not improbable that lead would induce a certain amount of antimony to leave the copper and form triple alloys; but Dr. Ball had shown that the antimony and copper alloys remained intact, and that lead merely diluted them. This was specially interesting, because, to turn to other metals, it is well known that zinc and lead if melted and mixed in the fused state separate from each other almost entirely on cooling. Notwithstanding this fact, A and L. Svanberg had shown that in the presence of a third metal, viz., tin, lead and zinc will unite to form a triple alloy $ZnSn_3 + 2PbSn_3$, which solidifies at 168° C. It was generally assumed that rapid cooling prevented the "liquidation" or separation of the constitutents of alloys, but the speaker had shown in the case of the silver-copper alloys that *slow* cooling produced products as uniform in composition as Levol's alloy containing 71·8 per cent. of silver, the only alloy of the series which was formerly believed to be uniform in composition. Professor Roberts-Austen added that he was glad of the new evidence afforded by the author's observations of the delicacy of the Hughes induction balance, an instrument which he had long since predicted would prove to be of great service in studying the molecular constitution of alloys.

Dr. C. R. Alder Wright said that the determination of the constitution of ternary alloys involved the solution of some very interesting problems, which in certain cases appeared to be of a far more complex order than was generally supposed. A great distinction was to be made between the amount of permanent miscibility possible with fluid metals whilst kept molten by heat, and the more or less complete segregation taking place during solidification on cooling, especially when slowly effected. In the latter case the separation appeared frequently to be regulated by the formation of alloys of definite constant compositions, atomic or otherwise, which possessed fusing points higher or lower than those of the rest of the masses; so that one portion solidified first, leaving, so to speak, a more fusible mother-liquor. But it was quite different in the former case: with certain metals in certain proportions the mixture when melted, well stirred together and then left quiescent for some time in a molten condition, separated into two layers, just as a mixture of ether and water, or certain mixtures of ether alcohol and water would do if shaken up and then allowed to stand. The relative proportions in which the metals divided themselves were doubtless regulated by some law, because one given mass always divided itself in one way, and another in another, and so on; but this law or guiding principle did not seem to be connected with combination in atomic proportions, nor upon the production of any one particular alloy which formed and separated from the rest of the mass. He was not in a position at present to indicate what really was the guiding principle in such cases, but hoped that some experiments upon which he and Mr. C. Thompson were now engaged would throw light on the question. These experiments were being carried out with various mixtures of lead, zinc and tin or bismuth. Thus, for example, a series of ingots were made by mixing equal weights of lead and zinc in each case with varying amounts of tin, melting together, well stirring and keeping molten for one to two hours, and then cooling without more delay than was absolutely necessary in order to diminish possible sources of error through incipient segregation during solidification taking place in either the bottom or the top one of the two layers into which the molten mass divided itself during the period of quiescence. The top and bottom portions being analysed and the lead and tin calculated per unit of zinc in the first case, and the zinc and tin per unit of lead in the second, and these pairs of values being plotted off as abscissæ and ordinates respectively, curves were obtainable from comparison of which he hoped to be able to deduce the guiding principle. In each case the amount of zinc taken up by the heavier alloy in which lead predominated, and that of lead in the lighter alloy in which zinc predominated, increased with the amount of tin present; but not always in the same ratio. Moreover, the relative proportions in which the tin divided itself between the bottom and top layers was not constant, but varied with the proportion of tin in the total mass; so that the production of atomic compounds of the metals, even if it occurred at all, was certainly not the sole exp'anation of the results. The principle of two saturated solutions being formed also appeared to be inapplicable. In answer to a further question by Dr. Ball, Dr. Alder Wright said that his experiments were as yet hardly complete enough to enable him to pronounce definitely, but he thought that the formation of an eutectic alloy would not afford an adequate explanation, because if this were the case, either the top or the bottom layer (presumably the latter, being usually the more fusible), should exhibit constancy of composition, which was very far from being the case. The principle of eutexia no doubt largely regulated the solidification of molten masses on cooling; but it did not seem to be so closely connected with the miscibility of molten metals kept fluid throughout. As regards avoiding loss by oxidation during fusion and volatilisation of zinc, he had found that a little cyanide of potassium previously fused in the melting pot largely if not entirely prevented both sources of alteration; and was preferable for this purpose to borax or metaphosphate of soda, etc., as these substances did not exert any reducing action, but simply cleansed the metal by dissolving any oxide that might be formed.

The Constitution of the so-called Mixed Azo-Compounds.—By Francis R. Japp, F.R.S., and Felix Klingemann Ph.D.

The Interpretation of Absorption-Spectra. By G. H. Bailey.

The Reduction of Potassium Bichromate by Oxalic Acid. By C. H. Bothamley, Assistant Lecturer on Chemistry, Yorkshire College.—Potassium bichromate and hydrated oxalic acid, finely powdered and intimately mixed, interact spontaneously after two or three hours, or instantly if heated to 30–35°; after heating at 110–120° until the weight is constant, a dark friable residue is obtained which is completely soluble in water. If the mixture which has been heated at 110–120° is heated over a low flame, care being taken to avoid fusion, further decomposition ensues, and on treatment with water chromic oxide remains undissolved and a solution of potassium chromate free from oxalic acid and chromic salts is left. If dehydrated oxalic acid be taken the interaction does not take place spontaneously, but occurs instantly at 30–35°, the product being a very bulky porous and

friable grey solid; the nature and limit of the interaction is, however, the same as with the hydrated acid. With an excess of oxalic acid, reduction is complete, but with excess of bichromate the interaction is different. The first stage of the interaction, which takes place at a temperature not exceeding 120°, is represented by the equation—

$$2\,K_2Cr_2O_7 + 6\,H_2C_2O_4 = Cr_2(C_2O_4)_3 + 6\,H_2O + 6\,CO_2 + 2\,K_2CrO_4.$$

The decomposition is limited, even in presence of excess of bichromate, by the formation of chromic oxalate, which is not further oxidized at 120°. At a higher temperature in presence of only a slight excess of bichromate the chromic oxalate decomposes in accordance with the equation $Cr_2(C_2O_4)_3 = Cr_2O_3 + 3\,CO + 3\,CO_2$. If, however, a considerable excess of bichromate is present further oxidation takes place thus:—

$$2\,K_2Cr_2O_7 + Cr_2(C_2O_4)_3 = 2\,Cr_2O_3 + 6\,CO_2 + 2\,K_2CrO_4.$$

The complete oxidation of oxalic acid in presence of a large excess of potassium bichromate is represented by the equation—

$$4\,K_2Cr_2O_7 + 6\,H_2C_2O_4 = 2\,Cr_2O_3 + 4\,K_2CrO_4 + 6\,H_2O + 12\,CO_2.$$

The Reduction of Chlorates by the Zinc-copper Couple. By C. H. Bothamley and G. R. Thompson.—When a solution of potassium chlorate is reduced by means of the zinc-copper couple (Thorpe, 'Trans.,' 1873, 541) a portion of the reduced chloride is converted into zinc oxychloride, which is insoluble in water but readily soluble in dilute sulphuric acid. The quantity of oxychloride formed is greater the more concentrated the solution. In order to avoid the error due to this cause, the chlorate solution is heated with the couple for about one hour, and pure dilute sulphuric acid is then added until the zinc hydroxide and oxychloride just dissolve. The liquid is filtered, neutralized with calcium carbonate and titrated with silver nitrate. Thus modified, the method gives very accurate results; the solution should not contain more than 1·5 gram of potassium chlorate in 25 c.c., and should just cover the couple.

Preliminary Notice on the Oxidation of Oxalic Acid by Potassium Dichromate. By Emil A. Werner, Assistant in the Chemical Laboratory, University of Dublin.—In the course of an investigation of chromoxalates and analogous chromium compounds with other organic acids, the results of which have already been partly published ('Trans.,' 1887, 383), I was led to study the action of oxalic acid on potassium dichromate solutions in presence of sulphuric acid. The results already obtained seem noteworthy, and in view of the fact that a paper on the same or a similar subject is announced, I send the following short note. In the preparation of the blue chromoxalates already described, 9 mols. of oxalic acid are required for the complete reduction of each molecule of potassium dichromate; in this interaction the oxalic acid is divisible into two distinct portions, viz., 3 mols. which are used up in the reduction of the dichromate, and 6 mols. which combine with the reduced chromium to produce the chromoxalate: *e.g.*,

$$2\,KCr_2O_7 + 6\,H_2C_2O_4 + 3\,H_2C_2O_4 = K_2H_4Cr_2(C_2O_4)_6 + 7\,H_2O + 6\,CO_2.$$

I have endeavoured to use instead of the persistent 6 mols. oxalic acid their equivalent of succinic acid, but I find that the interaction proceeded in an entirely different manner; only a *partial reduction* of the dichromate is effected by the 3 *mols.* of oxalic acid, and no compound whatever of chromium and succinic acid is produced, the final products of the reaction being:—(1) The red chromoxalate of Crofts, $K_2Cr_2(C_2O_4)_4$, and (2) free $K_2Cr_2O_7$ (about two-fifths of the original amount), the succinic acid remaining unaltered. If oxalic acid be added until the dichromate is all reduced, 9 *mols. are required*, and the interaction proceeds exactly as in the absence of the succinic acid. An attempt to effect a partial replacement of the oxalic by succinic acid was attended with the same result. From these results, I was led to investigate more closely the oxidation of potassium dichromate by oxalic acid in presence of sulphuric acid, and while looking over the literature of the subject, I was struck by the following account of the method of preparing chrome-alum in Watts' 'Dictionary' (3rd supplement). In the preparation of chrome-alum by the action of sulphuric acid on potassium dichromate, the reduction of the latter may be conveniently effected by oxalic acid, when it is not necessary to add an excess of the reagent, as the reaction is complete when CO_2 ceases to be evolved, etc.; the equation representing the change is as follows:—

$$K_2Cr_2O_7 + 4\,H_2SO_4 + 3\,H_2C_2O_4 = K_2Cr_2(SO_4)_4 + 6\,CO_2 + 7\,H_2O.$$

29·5 parts of dichromate are dissolved in 39 parts of sulphuric acid, and the necessary amount of water, and 38 parts of oxalic acid added gradually in small portions (Lielegg, *Dingl. polyt. J.*, ccvii., 321). The production of chrome-alum by this method is entirely dependent on the "necessary amount of water," the above equation being only true when little or no water is present, dilution of the mixture causing only partial reduction of the dichromate, with production of varying amounts of red chromoxalate and chromium sulphate, the former increasing, and the latter diminishing, with the degree of dilution, and *vice versâ*. I am at present engaged in investigating this reaction in all its details, with special reference to the influence of mass and temperature. The remarkable affinity existing between chromium and oxalic acid as shown in these reactions, becomes all the more interesting when compared with the not less remarkable inert behaviour of chromium towards succinic acid. All attempts, hitherto, to obtain compounds corresponding to the chromoxalate containing succinic acid have been unsuccessful; in fact, *freshly* precipitated chromic hydroxide is perfectly insoluble in excess of succinic acid solution at the boiling temperature, and when heated in sealed tubes at 120–130° C., only a mere trace of the chromium enters into solution.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The second ordinary monthly meeting was held in the rooms of the Chemical Club, at the Grand Hotel, on December 14, Mr. G. Woolley (Treasurer) in the chair.

The minutes of the previous meeting having been read and confirmed, it was announced that the Council had elected Mr. H. Wilson to the post of Joint Secretary, with Mr. William Elborne, F.L.S., in the place of Mr. F. Baden Benger, F.C.S., who had been compelled to resign after nineteen years service.

Members were again invited to send in to the Secretaries a list of any books they desired to be purchased and added to the Library.

The following paper was then read by Mr. Elborne:—

Remarks on Two Varieties of English-Grown Rose Petals (Rosa Gallica).*

by william elborne, f.l.s.,

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Red rose petals, on account of their perfume, colouring matter, and astringent properties, have, as well known,

* Syn.—*Rosa rubra*, Bauh., 'Hist,' ii., 34; Lamark, 'Fl. Fr.,' iii., 130; *R. centifolia*, Mill., 'Dict.,' n. 14; Willd., 'Sp. Pl.,' ii., 1171: 'Pers. Syn.,' ii., 48; *R. sylvatica*, Gater., 'Montaub.,' 94; *R. holosericea*, Röss, 'Ros.,' t. 16.—*Damascena rubro-purpurea, ibid.*, t. 18; *R. belgica*, Brot., 'Luist.,' i., 338; *R. cuprea*, Jacq., 'Fragin.,' xxxi., t. 34, f. 4; *R. pumila*, Bauh., 'Hist.,' ii., 35; Willd., 'Sp.,' ii., 1072; *R. austriaca*, Crantz. 'Austr.,' 86; Poll., 'Palat.,' 50; *Rosa, n.* 1104, Hall, 'Helv.'; *R. gallica, Lin.*, 'Sp.,' 704; Willd., 'Sp.,' ii., 1071; 'Redouté les Roses,' tom. i., 73, t. 25; 135, t. 52; ii., 17, t. 7; 19, t. 8, 10; *Bot. Reg.*, v., 6, t. 448.

been used in medicine from a very remote period, and are mentioned as objects of culture by some of the earliest writers of antiquity, Theophrastus, Herodotus and Pliny. The species of *Rosa* of most interest from a pharmaceutical point of view at the present time are :—

R. gallica, L., yielding *Rosæ Gallicæ Petala*, B.P.

R. canina, L., yielding *Rosæ Caninæ Fructus*, B.P.

R. centifolia, L., used in the preparation of *Aq. Rosæ.*, B.P.

R. damascena, Miller, used in the preparation of Otto of Rose.

Of the above, *R. centifolia* and *R. damascena* are botanically so closely allied to *R. gallica*, that by many eminent botanists they are regarded as one and the same species, and referred to *R. gallica*. Mr. J. G. Baker, of Kew, in his classification of garden roses, has classified the following sub-species and varieties under the well-marked type of *Centifoliæ*:—*

R. gallica, L. (*austriaca*, Crantz.).—Europe and Western Asia.
pumila, L. fil.
incarnata, Miller.
provincialis, Miller.
R. centifolia, Miller.—Orient.
muscosa, Miller.
pomponia, DC.
parvifolia, Ehrh. (*burgundica*, Rossig.; *remensis*, Desf.).
R. damascena, Miller (*bifera*, Pers.).—Orient.
belgica, Miller.
portlandica, Hort.
calendarum, Mœnch.
variegata, Andrews.
R. turbinata, Ait. (*francofurtensis*, Desf.; *campanulata*, Ehrh.).—Garden origin, perhaps hybrid between *gallica* and *canina*.
R. hybrida, Schleich. and *R. arvensis*, Krock., probably hybrids between *gallica* and *arvensis*.

Owing, however, to the fact that by cultivation the plant passes into so many varieties, it has become a task of almost insurmountable difficulty to determine which is a species or which a variety.

According to Flückiger and Hanbury† one of the varieties of *R. gallica* is the *Provins rose*, so called from having been long cultivated at Provins, in Seine-et-Marne, about sixty miles from Paris. That Provins became much celebrated, not only for its dried rose petals, but also for the conserve, syrup and honey of roses made from them, may be gathered from the following description by Pomet,‡ chief druggist to Louis XIV. of France (1694) :—"The roses called *Provins* are flowers of a deep velvet red (hautes en couleur, c'est à dire d'un rouge *noir*, velouté, tres-astringentes),§ and come in such great quantities from that place that it must be allowed that the ground there is absolutely most proper for their culture, and peculiarly adapted to the raising of these kind of roses, because in goodness and beauty they surpass all that come from other parts; and that which contributes to their excellency is, that the inhabitants thereabout are perfectly skilled in the drying of them, which makes them keep considerably longer than others, and preserves both their colour and smell. Those who make it their business to deal in Provins roses preserve them in such dry places that no air can enter in, and so close pressed or squeezed that they may retain their beauty for a year or eighteen months; but about that time they must bring them out, lest they lose their colour and worms breed in them; some put them in old iron to hinder the worms from destroying them. These Provins roses are of considerable use in physic, and enter several compositions of value. But since of late years these roses were dear, several druggists and apothecaries contented themselves with the common red roses that are cultivated about Paris and other parts, since which time there has not been that consumption of these roses as formerly; nevertheless those who have made use of the other sort have found that they are not equal to the true Provins rose in virtue, and will not keep so long."

In another work, dated 1536, the Provins rose is alluded to by Estienne in the following terms :—*Rosæ purpureæ odoratissimæ.**

The petals of *Rosa rubra* of the London Pharmacopœia (1824) were, according to Gray,† less odoriferous than those of the Provins rose, which latter in the same work are described as "petals deep red, scent powerful, which they preserve after drying;" moreover, the *R. gallica*, L., official in the French Codex, is specially designated as the Rose de Provins.

Red rose petals of the British Pharmacopœia are directed to be collected from plants cultivated in Britain, and at Mitcham and Bodicote, where the plants are principally cultivated, and incorrectly designated the damask rose; the petals are thus collected and dried :‡— "The flower-buds are gathered just before expansion, when they are about the size of a large nutmeg; the petals are then cut off near the base, leaving their whitish claws attached to the calyx. They are then carefully and rapidly dried by the heat of a stove, and when dried they are gently sifted to remove the stamens and other extraneous substances, and are then ready for the market. It is these dried petals of the unexpanded flowers, deprived of their whitish claws, which constitute the ordinary red rose petals of the pharmacies. The petals are collected before the flowers have expanded, because they are then much more astringent than when obtained from the full-blown flowers; they are also rapidly dried because slow desiccation injures both their colour and astringency. It has been computed that two thousand flower buds yield about 10 pounds of dried, or 100 pounds of fresh petals." The British Pharmacopœia describes them as consisting usually of "little cone-like masses, or sometimes separate, and more or less crumpled; fine purplish-red, retained after drying, velvety; odour fragrant, roseate, especially developed by drying; taste bitterish, feebly acid and astringent."

A writer in the *Pharmaceutical Journal*§ in 1850, has stated that two sorts of roses are cultivated at Mitcham, namely, one incorrectly known there as the damask rose, which Dr. Pereira referred to *Rosa gallica*, var. δ *officinalis*, D.C.; and the second, called at Mitcham the Provence or cabbage rose, which, according to Dr. Pereira, is the *Rosa centifolia*, var. α *vulgaris foliacea*, D.C. Mr. Edwin Bridger, of Mitcham, however, informs me that the latter kind is now no longer grown there, but at Byfleet (Surrey).

Having briefly referred to the history of the subject I now arrive at the point which has engaged my more immediate attention. When visiting Bodicote, in Oxfordshire, in June last, I had an opportunity, by the kindness of Mr. H. M. Usher, of inspecting the preparation of red rose petals for the market, and observed that there were in reality two varieties of the plant grown, the petals of either of which constituted commercial "fol. rosæ ang," differences which I believe have hitherto passed unnoticed, or of which at least I can find no published account, due probably to the fact that the buds of the two plants have always been picked promiscuously, and consequently afforded a mixed product.

Herbarium specimens of the two varieties were taken, and for the purposes of investigation, by the kindness of Mr. Usher, a quantity of the buds of each were carefully

* *Journal of Botany*, Sept., 1885.
† 'Pharmacographia,' p. 259.
‡ 'A Compleat History of Druggs,' by Pomet, Lemery, and Tournefort. 2nd edition. London. 1725. [An English translation].
§ Pomet, 'Hist. des Drogues,' [1694], p. 174.

* Stephanus (Carolus). Paris. 1536. (Brit. Mus.)
† 'Supplement to the Pharmacopœia,' 1832, p. 95.
‡ Bentley and Trimen's 'Medicinal Plants.'
§ Vol. x., [1], p. 170.

collected for the usual preparation of cutting and drying, and the products kept separate.

The following is a description of the two varieties :—

No. 1.—Petals of the expanded flower less numerous than in No. 2. of a deep purple colour. The dried product, in the usual cone-like masses, very fragrant rosaceous odour, deep *purple* colour, velvety, constituting about one-tenth of the fol. rosæ ang. produced on the estates. Much less prolific and more expensive to produce as compared with No. 2.

No. 2.—Petals of the expanded flower of a deep red colour. The dried product, in the usual cone-like masses, odour fragrant (quite different from No. 1), colour purplish-*red*, velvety, constituting the remaining nine-tenths.

The differences as regards the colour and odour presented by the two products when only superficially examined were so unmistakable that the question naturally arose, "which of the above corresponded to the official rosæ gallicæ petala of the British Pharmacopœia?"

M. Crépin, Directeur du Jardin Botanique de l'Etat, Brussels, to whom I submitted the herbarium specimens No. 1 and No. 2, for identification, pronounced each to be a variety of *Rosa gallica*, L., confirming my own views concerning them.

Fresh herbarium specimens and products of the so-called Damask rose cultivated at Mitcham, and of the Rose de Provins from Provins, in Seine et Marne, were also obtained; each of them were found to be identical with the Bodicote rose, No. 2.

That the original Provins rose was the variety most esteemed, and which originally brought dried rose petals into notoriety for use in medicine and pharmacy, there seems to be no shadow of doubt: and that they were of a deep purple rather than of a red colour, and exceedingly fragrant, may be gathered from the descriptions by Pomet, Estienne and Gray already alluded to, and from the following by Guibourt:—* "Les roses de Provins (*R. gallica*, L.) séchées doivent avoir une couleur pourpre foncée et veloutée, une odeur très-agréable, une saveur très-astringente"—with which descriptions the present Provins rose, the Bodicote No. 2, and Mitcham roses do not agree. The conclusion I have arrived at is therefore that the purple variety No. 1 now growing at Bodicote, corresponding so favourable with the above authors' descriptions, is most probably a veritable remnant of the original and true Rose de Provins, *Rosa gallica*, L.

These rose petals are used chiefly on account of their colouring principle and astringent properties, as in the infusion. The infusions made from, Nos. 1 and 2, viewed by transmitted light, are, in respect to depth of colour, undistinguishable.

The "Rosæ Gallicæ petala" of the British Pharmacopœia evidently correspond with the Bodicote variety No. 2, the Mitcham kind, and that now produced at Provins.

A lengthy discussion followed, in which the Chairman Messrs. Arrandale, Hart, Pratt and Wilson took part.

BOOKS RECEIVED.

THE CHEMISTS AND DRUGGISTS' DIARY FOR 1888. Including 'Pharmacolegia,' a Legal Compendium for Chemists and Druggists. London: 1887. From the Publishers.

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC AND PHOTOGRAPHER'S DAILY COMPANION FOR 1888. Edited by J. TRAIL TAYLOR. London: 1887. From the Editor.

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* 'Histoire abrégée des Drogues simples,' 3rd ed., vol. ii., 1836.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

APPRENTICESHIP IN PHARMACY.

Sir,—In your recent articles on the above subject, you appear to take a pessimist view, and think that the duty of teaching apprentices, and technically training a succession of men to fill our ranks, is much neglected. No doubt the division of labour and the introduction of factory-made preparations have, in a great measure, materially altered the condition of pharmacy during the last generation, and the age cannot be rolled back; but, surely, after all the preaching, teaching and examining, the working pharmacists of the present day are not less capable of training apprentices than their predecessors of forty years ago were. You seem to reason that they are unequal to the task, and to suggest that some scheme should be devised to absolve them from this onerous duty. From my experience of assistants I am inclined to deny that they are, as a rule, worse trained than formerly. For manipulative dispensing, many of this class in the present day are more expert and intelligent, and possess higher scientific attainments than any past race of the same. We certainly should not, for any visionary equivalent, give up even our present system of apprenticeship. The discipline learnt during this period is of the greatest importance in a profession in which technical skill and conscientious obedience to minute details quite as much as scientific attainments form the groundwork of our reputation and success.

There is no royal road to pharmacy; she is a hard mistress, and her rewards are slow in a fast age like this, which chafes under her servitude. The pupil, to obtain success, must say or feel "I have set thee before me—thee will I follow." It is an honourable pursuit, and if studiously inclined, though the seductive pleasures of light literature may attract on one side, or scientific allurements on the other, yet much of the leisure of the apprentice should be occupied in the well-directed study of pharmacy as applied to his daily work.

Regarding the amount of personal instruction to be given to an apprentice, it should, even in the master's own interest and safety, consist during the early part of his career of an explanatory trip through the Pharmacopœia, with catechizings on the same, having as many of the drugs and preparations put before the youth as possible. Opportunities should be given him to attend such classes in chemistry as the locality provides, and routine instruction in making and testing preparations should be given as occasions arise. I fear in many cases now the apprentice fee formerly paid is reserved by the parents for grinding the apprentice when out of his time at some school of pharmacy until he passes his examination. The master merely gets the youth's services for his training.

The kind of work expected to be done by an apprentice depends much on the amount of fee paid in money or service. Although he should not be the "bottle washer," the apprentice should be able to wash a bottle clean, and do so willingly at any time without breaking it. He should commence at the "rudiments." A veteran pharmacist in the eastern counties, who always had two or three apprentices under his care, on the morning after a new arrival, used to take the youth into the laboratory and tell him in a benevolent manner, "Now, sir, we will begin at the rudiments," and then set him to work under the care of an elder tyro to powder some drug in an iron mortar with a pestle weighing fifteen pounds, which utensil in time came to bear the name of "the old rudiments." Although not ground in this manner now, there are states of comminution required in pharmacy best produced by commencing at "the rudiments."

But after all our teaching, and having examined so many men, as I have said, is it to be allowed that we cannot train apprentices in our art? Granted, many preparations can be made more economically and satisfactorily on a large manufacturing scale, still the varied small requirements in a pharmacy give ample opportunity for the pharmacist to exercise his art without degrading himself to

the low level of being a mere huckster of Yankee nostrums. My experience, although not great in this line, has taught me that a good apprentice partially trained is a valuable assistant.

But what is the alternative for apprenticeship? Technical instruction in our art with lectures on the same in schools of pharmacy? This will be no equivalent and no discipline in pharmacy. It will tend to ruin our art, whatever is left of it. Would such mushroom pharmacists serve the public as well as they are served now? I trow not. The tendency of such would be to devote their energies into one line. They would not become masters of the whole art, nor care for the tedium it involves; they would inevitably, as our medical friends have done, drift towards specialism.

In the medical profession, since apprenticeship has fallen into desuetude, the want of its equivalent has been much felt by those interested in medical education.

The General Medical Council, in a recent debate, lamented that many who obtained their diplomas were ignorant of the diagnosis of scarlet fever or measles, and had never attended a case of childbirth! Omissions which under the old *régime* could hardly possibly have occurred.

New Cavendish Street, W. WM. MARTINDALE.

Sir,—I have read with some interest your leading article upon this subject in your issue of December 17, also the various letters that have lately appeared in the Journal, but they all seem to me to be full of despair for the future of the poor chemist and druggist, and all too fond of aiming blows at the Pharmaceutical Society as the cause of his fast decreasing business. I quite fail to see how the Pharmaceutical Society can be expected to help a body of men who make no attempts to help themselves. I have no time to examine carefully the various arguments against the calling of a chemist and druggist; but the main drift seems to be that because chemists find they are unable to meet competition, by some mysterious means, which no one even hints, the Society should come to their individual aid, considering the case of each shopkeeper, and suggest some means by which he can obtain a living in face of the opposition of the neighbouring grocer, stores, etc., down the street, who is selling his goods at cost price, the object of the grocer of course being to make his profits out of goods other than patents, etc. How can a chemist meet such competition? I say he cannot (except in very rare cases indeed), and he is a fool to try. But what he can do is to use his superior knowledge and scientific training in adding departments to his business for which he sees a want in the town he is situated; by this I mean departments that are somewhat allied to his business, and in which his chemical knowledge would greatly assist him. He has no occasion to do anything *infra dig.* or unprofessional. In my own town of Preston we have next door but one a grocer selling patent medicines, druggists' sundries, etc., at about cost price, as he states, "to oblige his customers," and I believe all the chemists in the town, with one or two exceptions, cut down the price of patents almost to the price the customer asks to be supplied with them at. I am glad to say with one or two exceptions we get full price, and I am informed by commercial men that our account with the wholesale patent medicine houses is one of the largest in the town (Preston has about 100,000 inhabitants). Perhaps to some extent I may put this down to our central situation, but to only a very small extent. For an experiment about four years ago we cut down the price of Winslow's Syrup to 9*d.* per bottle, smothering the bottle in our own circulars, but it has done no good, and to-day it is one of the patents we sell the least of. No society ever could possibly do more for the aid of chemists and druggists than did the Chemists and Druggists' Trade Association, of Birmingham, pioneered by Mr. Thomas Barclay, a gentleman who if chemists and druggists would take a leaf out of his book, and meet all questions that may from time to time turn up in their business from a broad commercial aspect, they would have no reason to deplore the scanty deposit in their till each evening.

I was apprenticed to my father who was, and is now, the proprietor of this business. At the age of fifteen, the business then—and up to the time of my leaving him at twenty years of age, to the time of my returning about five years afterwards—was that of a well-conducted retail mixed chemist and druggist business, with considerable dispensing and county trade. At the age of twenty years my father thought it well that I should go out as an assistant and gain other experience, and I was fortunate in obtaining a situation at the retail establishment of Messrs. J. Woolley, Sons and Co., Manchester, where, it is needless to state, I had my eyes opened. At that age I was not at all well impressed with the business, and although I then considered myself not at all a muff at my trade, at my first assistantship I very soon found my many deficiences. It is needless to say at such an establishment as this I obtained a large amount of useful knowledge and experience, although obliged to leave from ill-health before being there twelve months. Upon my recovery a few months afterwards I was again fortunate in obtaining an assistantship with Messrs. Southall, Son and Dymond, Birmingham, in their retail department, where I spent about three of the happiest years of my life, and gained an amount of knowledge and experience that has been most useful to me. Leaving Birmingham one evening I went up to London, passed my Minor next day, and returned to business the following day, soon afterwards leaving my situation and returning to my native town to assist my father in business. And now began my anxiety. I found the business I had left a few years ago had every chance of dwindling away, no matter how my father and self exerted ourselves. I at once became a "Disgusted Chemist's Assistant," and reviewed my situation from all standpoints, but think as I would I could not see how more than a very bare living was to be made by conducting the business on the same lines my father had so successfully done for over thirty years. I therefore had a trial of the wholesale, and having gained a good knowledge of the manufacture of high class pharmaceutical preparations, issued a price list, offering all the usual preparations and drugs at the prices quoted in the price list of a very well-known and high class wholesale London drug house, being very careful that every preparation sent out was as good as it could be. I did the travelling myself, going to the towns and villages within about twenty miles of Preston; with the medical profession, surgeons, dentists, etc., I got on very well, but with chemists and druggists, with one or two exceptions, not so well. Among medical men I made some first rate clients, who thanked me for the information I was frequently able to give them, and many have had good trade accounts at this business ever since, now ten years ago. Nevertheless, my advice to the rising pharmacist is, do not attempt the wholesale drug trade, unless you are fortunate in obtaining a partnership in an old and well-established firm.

I now, Mr. Editor, come to the department which I strongly advise any chemist and druggist to add to his business, that of an electrician and telegraph engineer. Upon the discovery of the telephone, I was fortunate in being present at a lecture upon this instrument at a local educational establishment, and was so struck with the simplicity of this instrument, and the working of it, that I at once obtained a pair from the patentees, and erected a telephone line from these premises to our warehouse, about fifty yards. At these instruments and batteries, bells, etc., I worked night and day for about six weeks, making myself thoroughly master of them and their workings in all their details, soon finding myself an electrician. The Preston corporation advertised for tenders for a short line. I obtained the order, erected and supplied the whole apparatus to their satisfaction. Scarcely was this line finished before we had many applications from private firms for similar work. I engaged the services of a competent electrician and lineman, and we have been engaged ever since upon electrical work of every description. We find this a fast increasing business. What with electric bells, lightning conductors, medical batteries, thief and fire alarms, we are able to keep a good staff employed, and find it much pleasanter work than trying to persuade a customer that our Cockle's pills at 1*s.* 1½*d.* are genuine, whereas those he obtained at the grocer's down the street at 9*d.* hardly can be, or trying to persuade some customer that some preparation of our own is much superior to the one he asks for. By the way, the attempt to sell one's own preparations in the place of those asked for, and of well-known repute, is one, I think, calculated to damage the business of any tradesman attempting it, and cannot

be too strongly deprecated. I do not by this mean to imply that a chemist and druggist should not or has not a perfect right to put up and push his own preparations as much as he likes, if he does so fairly and honourably; but, when a customer asks for a bottle of Eno's Fruit Salt or Lamplough's Saline, and the chemist immediately states, "I have a preparation of my own which is quite equal to what you want, is better and only half the price, try a bottle of that," he outsteps the bounds of fair trade, and in many cases creates a very bad impression in the mind of his customer. My idea is to let every customer have what he asks for in good condition, handed to him quickly, without any of the humbug you expect to receive from a seaside barber, who has only about three months in the year to make his living; if this is done, and a well assorted stock is kept, I am confident that the tradesman who gives his customer what he wants, will have more time to attend to other business, and be a gainer in the end over the "our own preparation man." Going back to the subject of electricity, I think the Pharmaceutical Society should add to their curriculum "magnetism and electricity," setting apart a suitable laboratory for their teaching. I do not wish the Society to turn out competent electricians, but to teach the students these subjects about so far as is taught by the first and second grades of the South Kensington Science and Art Department. This would be quite sufficient to enable any chemist, if he wished to do so, to acquire afterwards himself the knowledge necessary to qualify himself for the calling of an electrician.

There are hundreds of towns in England of 50,000, and, I venture to say, up to 100,000 inhabitants, where if the user of a medical battery wished some slight repairs he would not find a man in the town with the skill requisite to undertake the repairs, no matter how simple. Then why let this opportunity go past? It is in the power of every chemist and druggist to add this department to his business. In some towns perhaps it would not be worth while where there are already several established electricians, but this is rarely the case. The chemical knowledge of the every-day chemist and druggist will give him an advantage over any electrician not having such a training. In my case I have proved this over and over again, many a time being able to cope with difficulties that electricians very much my superiors in their knowledge of electricity have been unable to deal with.

Another department I say add, and that is the profession of an "analyst." The manufacturers and farmers of this day rarely buy or use much bulk of material without sending a sample for analysis, and how can the chemist and druggist better employ his spare time than by adding a few guineas to his income in this way, at the same time raising himself above the ordinary shopkeeper? I could suggest many other departments, but am afraid I have already trespassed too much upon your space. Such departments as the sale of photographic materials and chemicals. The chemist is the man above all others who should be appealed to in this branch of science, the dry plate system having so simplified photography that almost every house, from the nobleman to the artizan, has some member in it who is paying attention to this most interesting subject. Then where have all the chemicals to be obtained from? They are at present not being obtained from the chemist as a rule, except such as come under the Poisons Act, and the photo dealer dare not sell.

In concluding, Mr. Editor, I contend that the chemist and druggist has no one to blame but himself for his miserable position. With his superior knowledge he has in nine cases out of ten no right to refuse to undertake any work of a scientific nature. About three years ago a man walked into our shop, and addressing me said, "Are you Mr. Sharples, Junior?" Replying "Yes," he said, "I have bought a wrecked vessel lying high and dry at low water, but it is submerged about two hours before high water. I have received orders from the harbour commissioners that she is in the fair way of incoming and outgoing vessels, and she has to be removed. Can you blow her up with dynamite for me?" My reply was, "With pleasure!" I had never seen a cartridge of dynamite in my life, had no idea where it was to be obtained, or how the work was to be done. I appealed to our managing electrician, and he had a good knowledge of explosives. Two days afterwards we proceeded to the wreck, placed out forty pounds of dynamite in her bow and other strong parts, and blew the vessel into thousands of pieces. We have now a magazine, and are registered dynamitards, the only ones in this district, and it is needless to say that the same staff who undertake the electrical work of this business also are the dynamitards. I wonder what the majority of chemists and druggists would have said to this man had he appealed to them. Not unlikely rushed into the back shop, as if the premises were on fire, informing wife and children (chemists and druggists, like poor parsons generally, have lots of these) that they were in danger of being blown into another world and had better quit the premises at once! There was a man in the shop who was talking about dynamite, and he looked like a Fenian or Nationalist.

I am confident that no amount of aid the Pharmaceutical Society can possibly ever bring to bear for the welfare of chemists and druggists can ever benefit them very much. The remedy is with themselves. The Chemists and Druggists' Trade Association of Birmingham attempted to champion the cause of chemists and druggists upon the very points the Pharmaceutical Society is being continually blamed for not doing, and what has been the result? The chemists would not pay a paltry 5s. a year for their own protection and interests. We took up the secretaryship here. Upon one occasion I spent three days going round to the various chemists in Preston (there are about fifty in the town) explaining the advantages that would be likely to accrue to chemists and druggists by becoming subscribers and paying 5s. a year, and with all the persuasive eloquence I was able to bring to bear, was not able to get a score of subscribers. I have canvassed for many a much less deserving object than this from time to time, but never in my life heard such paltry arguments advanced as an excuse for not subscribing; they would have disgusted the most thick-skinned pen-hawker. Further, we last year sent round one of our assistants to collect the annual subscriptions to the Pharmaceutical Society, my father being Local Secretary; most of them were collected, but several absolutely refused to pay our assistant, stating they preferred to send direct to the Society, evidently thinking we had some commission for this work, and they were not going to let us have anything out of them. Now, Mr. Editor, I should like to know how such men are to be assisted when they will neither assist themselves, or help each other?

CHARLES H. SHARPLES, F.C.S., A.P.S., ETC.

Preston.

A CHEMIST'S APPRENTICE'S VIEW OF THE FUTURE OF PHARMACY.

Sir,—It was with great pleasure that I read "Eguf's" letter in your last issue. I quite agree with him as to the small amount of interest taken by the majority of chemists in the proceedings of the Society, and in their profession, and I think it reflects great discredit on those chemists who, I firmly believe, constitute the grumblers, and those who are at fault in making the future appear so gloomy. As far as I can see, the Society does all in its power to promote the interests of the trade, and is not successful at present because of the want of interest taken by the majority of the trade in its proceedings, and the wretched support they give to the Society.

It is not State protection we want; we have enough of that already, and if the Society at large will only work together and support the Council, we shall want no more. Men of spirit and courage protect themselves; cowards only need outside protection. We hear a great deal about this State protection, but no one has ever said what form it is to take, and I do not think anybody ever will.

The fault lies with the Local Secretaries. These men, I believe, were appointed to look after the interests of the Society in their various districts. Now, this duty is entirely neglected; not a particle is done by them to endeavour to put a stop to the practice of "cutting," which is ruining the trade, nor towards producing good feeling between their brother chemists. Each chemist appears to think it his duty to run down his brother chemists for his own advancement.

There are men who give great help to the store keeper by their gratuitous advertisements, such as "Store prices here for cash," and similar placards. Such men are unworthy of a place in the Society, and it is the duty of

the Local Secretary to remedy this, and this is the remedy I venture to suggest.

Let the Local Secretary summon together his brother chemists, and take counsel together how this state of things may be remedied, and if necessary let circulars be sent out setting forth the reasons against low priced drugs and medicines, and appealing to the common sense of the public for confirmation of those reasons. Let this be signed by the various chemists of his district and circulated. The respectable people will soon recognize the justice of the plea, and instead of the present gloomy aspect in the future we shall have the Pharmaceutical Society of Great Britain looked upon as one of the brightest ornaments to the scientific and medical world, and the chemist, instead of being looked upon—as at present—as a mere tradesman in drugs and galenicals, will be looked up to as a man of skill and ability, and will be respected both by the medical profession and the public at large.

The Potteries. ANOTHER HOPEFUL APPRENTICE.

Sir,—I regret to see that the leaders in the recent Journals have not stimulated more correspondence from sources whence we would expect some pithy material. The Journal being the medium *per quo* members, associates and apprentices of the Society can exchange ideas. I should think that "Apprenticeship in Pharmacy" would be a fit and proper subject for a stirring discussion; but, alas! few are the letters which have been written on such a deserving nucleus.

"Hopeful Apprentice," in the last Journal, methinks writes rather hastily; who would care to spend three years at a pharmacy and a like period at a college for the ultimate recompense that the public is wont to grant for its medicine? Who would, if he were fully fledged with high scientific degrees and diplomas, care to condescend to retail such articles as we now have to do? Few parents could afford such an elaborate education as the writer anticipates. It would be a mere accomplishment to be able to write all sorts of equations in organic chemistry and theorise by the yard about magnetism and electricity; the public would still adhere to the man who practically knows his business as a pharmacist and pay him as little as they could for his labour. Were pharmacy a profession requiring a like demand of public patronage as the medical, things would wear a different colour, but as long as we keep an open shop a scientific theoretical education seems to me superfluous.

When "Hopeful Apprentice" becomes a master he will soon find that "he will not be happy unless he gets money," and that the idea he has clad in such a flourishing poetical style will "go from his gaze like a beautiful dream."

I fully endorse the acquisition of a thorough good education, but yet let us be thorough alike in theory and practice. I have seen men admired for their theory but ridiculed in practice. Would a master like to pay his assistants a high salary when their brains could concoct none else than theory pure and simple? If we learn pharmacy thoroughly and adhere to that we shall be then recognized as a powerful support to those who practice the healing art. He who has taken for his *nom de plume* "No Bonno Johnie" I should say is possessed of eccentric ideas *re* pharmacy. I hope "that when he comes up to London" he will be taught his business, and not such a mixture of trade as he has already seen.

It is a painful matter to think that men who take upon themselves to teach pupils in pharmacy and accept from their parents and guardians "moderate premiums," should be guilty of such neglect that, though the pupils have diligently served their apprenticeship in their establishments, yet on entering business in London or any large town where pharmacy is carried out in a methodical manner, they find that they know no pharmacy. I sincerely hope that this correspondence, which is well held up by the Editor, will not collapse without some decided improvement being effected both for the apprentice's and the master's sake.

Kensington. A. P. S.

Sir,—In your issue of the 10th ult. I notice a letter from one who signs himself "A Disgusted Chemist's Apprentice." I am afraid he is rather inclined to look on the dark side of things, evidently—adopting his nautical metaphor—his idea in embarking on the vessel "Pharmacy" was simply for the sake of profit and gain. Now, through these competitive times when the future does not loom very bright, he thinks of the hard work and expense before him, even to pass the Minor examination, and mentions, as a recompense for all the trouble, that he would start on the same level as grocers, drapers, etc. I quite agree with him so far concerning the encroachments of the above class of traders, but I have no doubt eventually it will have the attention of the Society. An educated body of men surely have the confidence of the public, and when it is seen that the Society seeks, not for a monopoly, but to legislate for the public good, the evil will be remedied.

"A Disgusted Chemist's Apprentice" should bear in mind that each must do his utmost to support the Society, and that no good is accomplished by the continual caterwaul of discontent, so common of late; least of all should the lucrative success in business be compared as a recompense for the work of examination, which should be estimated by the pleasure derived from the knowledge gained. Apart from the superior position, or semi-professional character it may give, I consider that it is a grand thing that it is necessary for us to study, and I think after all our labour one can find a recompense even while he sells a "penny packet of salts."

Brixton. GUY SAPWELL.

FERROUS HYPOPHOSPHITE.

Sir,—By a curious coincidence Mr. Everson's paper appears simultaneously with my remarks on the preparation of ferrous hypophosphite by the direct solution of iron wire in hypophosphorous acid. I can quite corroborate Mr. Everson in what he has said with regard to the applicability of the process for the preparation of the syrup, but Mr. Martindale's suggestion goes much further than this. He aims at having a strong solution of ferrous hypophosphite containing say 5 grains in each fluid drachm, from which all the preparations containing this salt could be made. This, I need hardly say, is a distinct advance on any previous proposal.

I can also fully corroborate what Mr. Everson says with reference to the composition of commercial hypophosphite of iron. My remarks at Edinburgh were even stronger than the condensed report gives me credit for. I said that if ferrous hypophosphite were ordered in the way of business the chances were that it would be ferric hypophosphite long before it reached the retailer's hands; in other words, ferrous hypophosphite oxidizes with such rapidity that it is practically impossible to keep it in that condition. This is the reason why solutions containing this salt are so liable to deposit, ferric hypophosphite being very insoluble in water.

Permit me to point out a slip which Mr. Everson has quite inadvertently made. He gives the formula of ferrous hypophosphite as $Fe2PH_2O_2$, but of course anhydrous ferrous hypophosphite is an impossibility. The accepted formula is $Fe2PH_2O_2 \cdot 6H_2O$, so that Mr. Everson, in omitting to allow for the water of crystallization, gives a formula in which there is 60 per cent. excess of iron. The quantity mentioned, 49 grains in the pint, is equivalent to 1·63 grains of ferrous hypophosphite per fluid drachm; 30 grains of iron wire is all that is necessary to ensure 1 grain in each drachm, and of course the quantity of hypophosphorous acid must be correspondingly reduced. With this correction the formula will no doubt give admirable results.

Hawick. T. MABEN.

T. C.—If the article comes within the definition of a patent medicine it is exempt from the provisions contained in the first fifteen sections in the Pharmacy Act, relating to registration of qualification.

W. H. Dangerfield.—*Fabiana imbricata*, or "pichi," a Chilian drug, said to be useful as a remedy in vesical catarrh and allied diseases. (See before, Oct. 1, p. 278, and vol. xvi., pp. 543 and 722.)

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hooper, Warden, Hill, Tichborne, Merck, Miller, Wilberforce, Minor.

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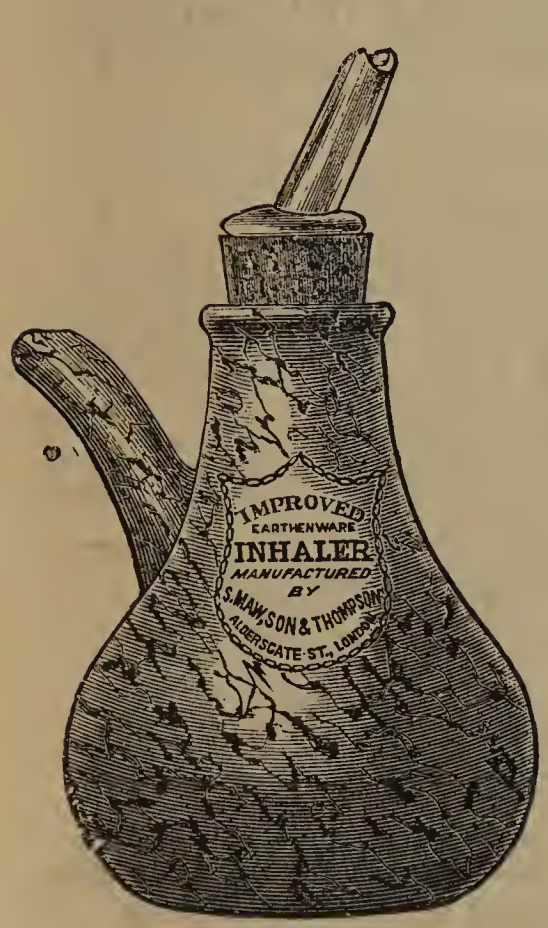

Fig. 8.
MAW'S IMPROVED.

Fig. 6.
MAW'S DOUBLE-VALVED.

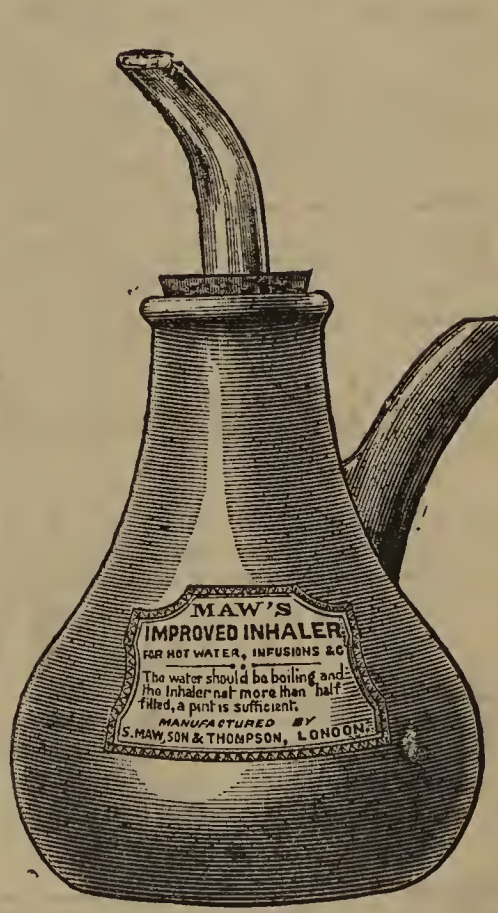

Fig. 8a.
MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.

Fig. 8.—Marbled, 32s. per dozen. Fig. 8a.—White, 21s. per dozen.

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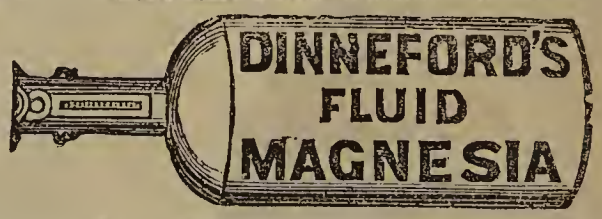

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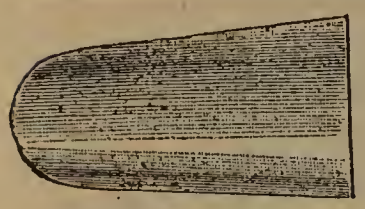

Fig. 5

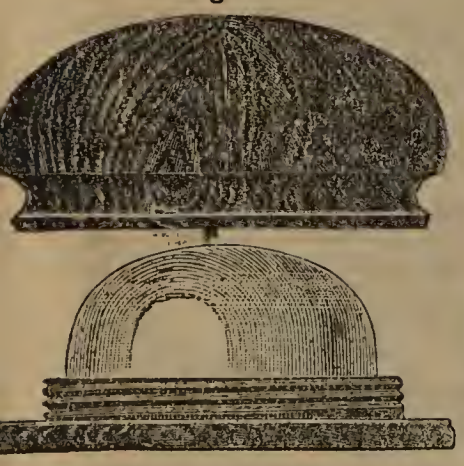

Fig. 1.

Fig. 3.

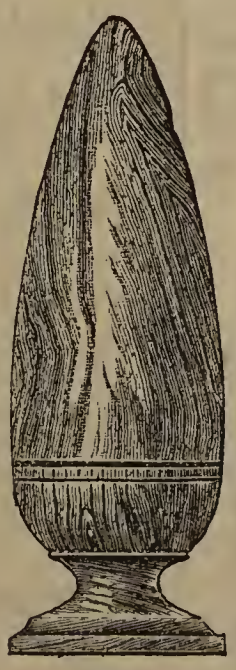

Fig. 4.

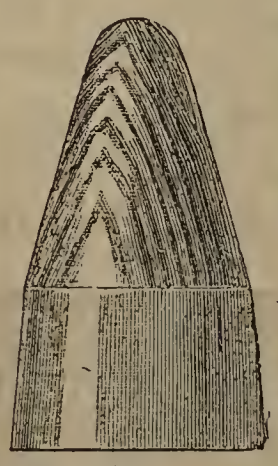

Fig 6.

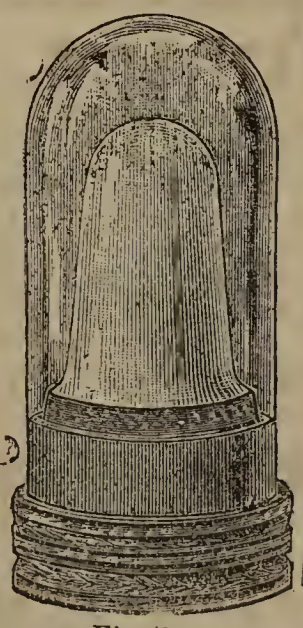

Fig. 7.

Fig. 8.

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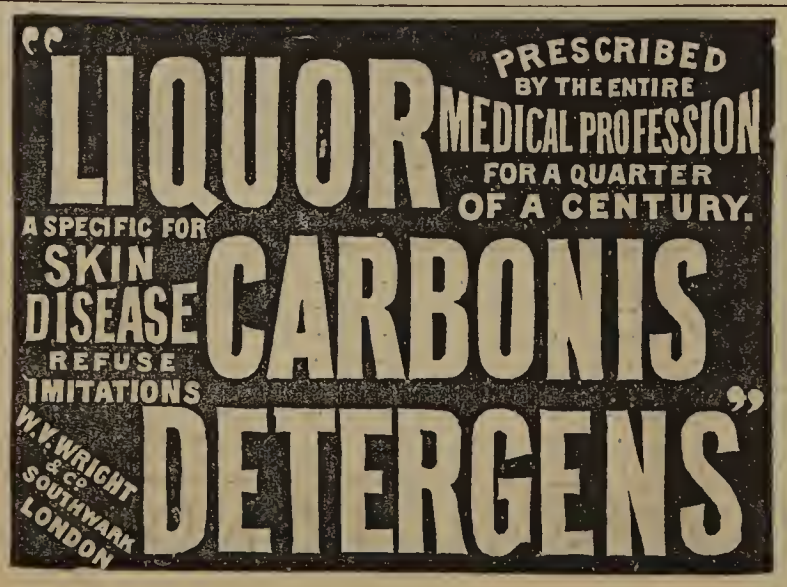

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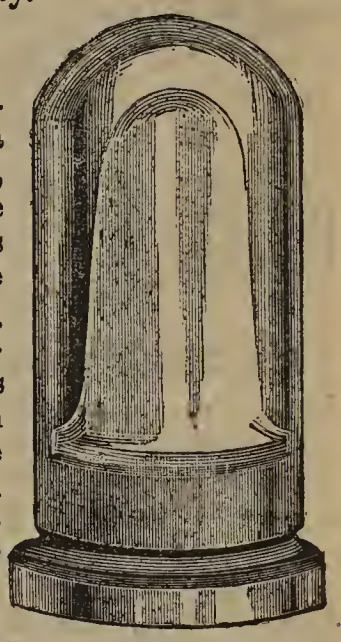

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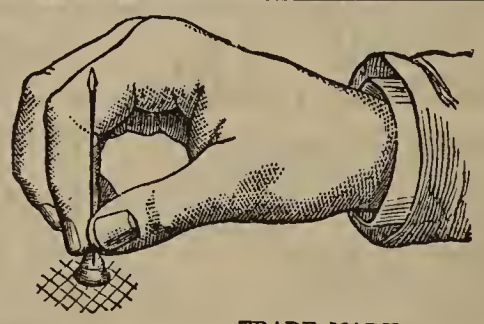

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MINOR.

Mr. J. BROOKES.
„ G. A. BATTYS.
„ W. E. CALLAM.
„ J. J. COOPER.
„ C. COOPER.
„ D. DAVISON.
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Mr. P. PAIN.
„ W. H. PLEWS.
„ J. PRIOR.
„ C. A. REES.
„ P. REYNOLDS.
„ T. W. ROBSON.
„ — ROUTLEY.
„ — RYALL.
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PASS LIST FOR OCTOBER.

MINOR.

5 sent in, **all passed**, viz.—

Mr. T. EDMONDSON..... .....Cockermouth.
„ G. J. KERR .....Liverpool.
„ H. MADDOCK .....Manchester.
„ J. W. WHITELY .....Gainsborough
„ F. H. WILKINSON .....Tranmere.

PRELIMINARY.

2 sent in, **both passed**, viz.—

Mr. J. R. AMBLER .....Birkenhead.
„ H. SCHUHMACHER..... .....Liverpool.

JULY.

4 passed the Minor, **all at their first attempt**, viz.—

Mr. W. BENTLEY.....Egremont.
„ F. BIRKETT .....Workington.
„ T. W. CARR .....Knaresborough.
„ T. CLOUGH .....Liverpool.

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MINOR.

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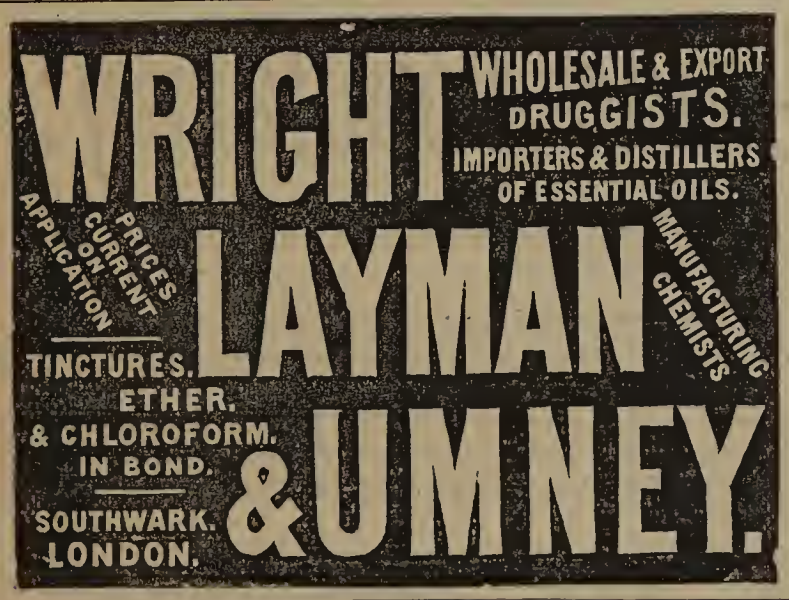

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